

## PATENT ABSTRACTS OF JAPAN

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(21)Application number : 2000-148440 (71)Applicant : TIS INC

SUMITOMO CHEM CO LTD

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(72)Inventor : NISHIHARA SHINJI

KOKUBU TSUTOMU

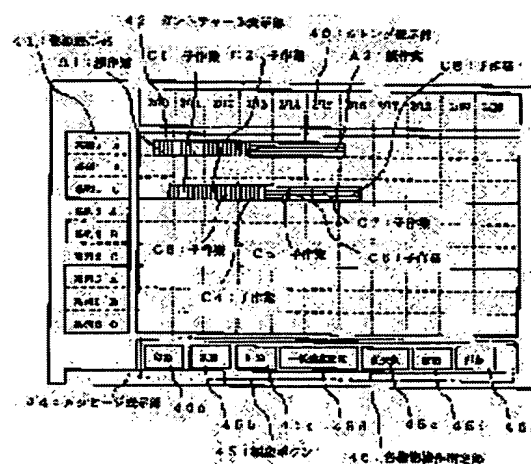
AIBA TAKASHI

### (54) PRODUCTION PLAN PREPARING DEVICE AND MEDIUM

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a mechanism for allowing a person in charge of a production plan to correct a production plan in a plant in a batch, and a technique for performing the change of the production plan matched between an intermediate product and a final product.

SOLUTION: This production plan preparing device is constituted so that a plan for production constituted of a main process for producing an intermediate product and a sub-process for producing a final product to be manufactured from the intermediate product is prepared. In this case, the production plan can



be displayed, and the change of the production plan can be instructed through an inputting part so that when the main process is changed (or the sub-process is

changed), the sub-process (or the main process) can be changed and displayed linked with this.

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## LEGAL STATUS

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## CLAIMS

[Claim(s)]

[Claim 1] the production-planning organization equipment which is interlocked with this, and will change and display a child process (or a parent process) if it is production-planning organization equipment which composes production planning which consists of a child process which produces the final product manufactured from the parent process who produces an intermediate product, and its intermediate product, it has the display which displays production planning, and the input section in which change of production planning makes direct, and a parent process is changed, and a child process is changed or --

[Claim 2] The aforementioned display is production-planning organization equipment according to claim 1 which associates and displays the child process which consists of the parent process which consists of information concerning the parent resources which produce a predetermined intermediate product, and a work period which occupies the parent resources, information concerning the child resources which produce a predetermined product, and a work period which occupies the child resources.

[Claim 3] The production-planning organization equipment according to claim 1 or 2 further equipped with the storage section which remembers to be the information which associates the information concerning an intermediate product, the information which describe a parent process by the work period which occupies the parent resources which produce the intermediate product, and its parent resources, the information concerning a product, the information which describe a child process by the work period which occupies the child resources which produce the product, and its child resources, and the aforementioned parent process and a child process.

[Claim 4] The aforementioned production planning is production-planning organization

equipment given in the claim 1 or any 1 term of 3 which consists of one or more parent processes or one or more child processes.

[Claim 5] Production-planning organization equipment given in the claim 2 which will change and display the start time of the work period of a child process after a predetermined time delay from this parent process if the start time of the work period of a parent process is changed, or any 1 term of 4.

[Claim 6] Production-planning organization equipment given in the claim 2 which will change the work period (or quantity of production) of the parent process related with the child process if the work period (or quantity of production) in a child process is changed, or any 1 term of 4.

[Claim 7] Production-planning organization equipment given in the claim 2 which will change the product term of the parent process, the quantity of production, or a production rate if the number of the child processes related with a parent process is changed, or any 1 term of 4.

[Claim 8] Production-planning organization equipment given in the claim 2 which will delete the child process related with the parent process if the aforementioned parent process is deleted, or any 1 term of 4.

[Claim 9] Production-planning organization equipment given in the claim 2 which will bundle up the child process related with the parent process, and will shunt if shunting for which make the work period of the aforementioned parent resources release, and a parent process is made to suspend temporarily is directed, or any 1 term of 4.

[Claim 10] Production-planning organization equipment given in the claim 2 which is made to maintain the ratio of each work period, bundles up the work period of each child process, and is made to expand and contract when expansion and contraction of the work period of two or more of the whole child processes are directed to two or more child processes relevant to one parent process, or any 1 term of 4.

[Claim 11] Production-planning organization equipment given in the claim 2 which makes shortening of the period of the parent process from the start time of the child process relevant to the parent process to [ before the predetermined lead time ] suppress when shortening of the period of a parent process is directed, or any 1 term of 4.

[Claim 12] As opposed to the parent process which occupies the 1st parent resources which produces an intermediate product, and the child process which produces the final product manufactured from the intermediate product When there is a work period when the child resources relevant to the 2nd parent resources which can produce the aforementioned intermediate product, and the 2nd parent resources are not occupied

reference 2

Production-planning organization equipment given in the claim 2 which will move collectively the child process related with the 1st parent process to the child resources relevant to the 2nd parent resources and the 2nd parent resources if movement of a parent process which occupies the 1st parent resources to the work period is directed, or any 1 term of 4.

[Claim 13] Production-planning organization equipment given in the claim 2 which exchanges the period of the child process related with each parent process when exchange of a work period is directed to two parent processes of occupying a different work period in the same parent resources, or any 1 term of 4.

[Claim 14] Production-planning organization equipment given in the claim 2 which will carry out front stuffing movement also of the related child process collectively if the aforementioned input section detects the directions which carry out front stuffing movement of the 2nd parent process till the end time of the 1st parent process when the 2nd parent process occupies the resources which set the specific period and the parent process occupied after the 1st parent process, or any 1 term of 4.

[Claim 15] Production-planning organization equipment given in the claim 2 which will also move a related child process collectively if the aforementioned input section detects the directions which carry out back stuffing movement of the 1st parent process till the start time of the 2nd parent process when the 2nd parent process occupies the resources which set the specific period and the parent process occupied after the 1st parent process, or any 1 term of 4.

[Claim 16] The record medium which is characterized by providing the following, which recorded the program and in which computer reading is possible The step which it is [ step ] the program which makes production planning which consists of a child process which produces the final product manufactured from the parent process who produces an intermediate product, and its intermediate product compose, and displays production planning on a computer The step to which change of production planning is made to direct the step on which this will be interlocked with, and a child process (or parent process) will be changed and displayed if a parent process is changed, and a child process is changed or --

[Claim 17] The aforementioned step which gives an indication is the record medium which recorded the program according to claim 16 on which the child process which consists of the parent process which consists of information concerning the parent resources which produce a predetermined intermediate product, and a work period which occupies the parent resources, information concerning the child resources which produce a predetermined product, and a work period which occupies the child

resources associates and displays and in which computer reading is possible.

[Claim 18] The information concerning an intermediate product, and the information which describes a parent process by the work period which occupies the parent resources which produce the intermediate product, and its parent resources, The information concerning a product, and the information which describes a child process by the work period which occupies the child resources which produce the product, and its child resources, The record medium which recorded the program according to claim 16 which performs further the step which memorizes the information which associates the aforementioned parent process and a child process and in which computer reading is possible.

[Claim 19] The record medium which recorded the information which associates the information concerning an intermediate product, the information which describes a parent process by the work period which occupies the parent resources which produce the intermediate product, and its parent resources, the information concerning a product, the information which describes a child process by the work period which occupies the child resources which produce the product, and its child resources, and the aforementioned parent process and a child process and in which computer reading is possible.

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## DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] this invention relates to the production-control technology in a plant.

[0002]

[Description of the Prior Art] A chemistry maker's production-planning person in charge needs to change production planning according to various factors, such as change of an order-received situation and influence by actual production. This production planning consists of combination of two or more work groups.

[0003] However, a means to correct collectively a work group with the relation planned by different production facility (henceforth resources) did not exist, but needed to be adjusted individually. Moreover, in the mass production which produces

especially an intermediate product and produces a final product continuously from the intermediate product, correction of the production-planning change in consideration of the parentage which is mutual relation of an intermediate product and a final product took the long time. For this reason, the situation of the difference between a plan and an actual result being expanded had occurred.

[0004] Generally as a concrete example, two processes are set as the object of production planning greatly a polymerization process and like a fitter by manufacture of the synthetic resin in petrochemistry. In the Prior art, production planning of a polymerization process (or fitter degree) was drawn up previously, and the plan like a fitter (or polymerization process) was developed after that. For this reason, when production planning of a polymerization process was changed, change like a fitter needed to be carried out individually and the load of change work became very large.

[0005] Furthermore, in the production-control method of not taking a parentage into consideration, even if efficiency was actually impossible for the work plan after change, since the check of a work plan was not easy, it might be changed as it is. Moreover, since the thing based on the demands (the time-for-delivery change from a customer, directions error of a operating section, etc.) from other than a production section was most and the conventional production-planning change corresponded to a sudden change of production planning, skill was needed for the production-planning person in charge.

[0006]

[Problem(s) to be Solved by the Invention] this invention is made in view of the trouble of such a Prior art, and let it be a technical problem for a production-planning person in charge to offer the structure which enables package correction of production planning in a plant easily.

[0007] Moreover, this invention aims at offering the technology which enables change of production planning which was able to take adjustment between the intermediate product and the final product.

[0008]

[Means for Solving the Problem] this invention adopted the following meanses, in order to solve the aforementioned technical problem. that is, this invention is production-planning organization equipment which composes production planning which consists of a child process which produces the final product manufactured from the parent process who produces an intermediate product, and its intermediate product, if a parent process is changed as the display of production planning enables and change of production planning can direct through the input section, and a child

process is changed or, is interlocked with this, and will change and display a child process (or a parent process)

[0009] The above-mentioned display may associate and display the child process which consists of the parent process which consists of information concerning the parent resources which produce a predetermined intermediate product, and a work period which occupies the parent resources, information concerning the child resources which produce a predetermined product, and a work period which occupies the child resources.

[0010] What was further equipped with the storage section which remembers to be the information which associates the information concerning an intermediate product, the information which describe a parent process by the work period which occupies the parent resources which produce the intermediate product, and its parent resources, the information concerning a product, the information which describe a child process by the work period which occupies the child resources which produce the product, and its child resources, and the above-mentioned parent process and a child process is sufficient as the above-mentioned production-planning organization equipment.

[0011] The above-mentioned production planning may be further equipped with one or more parent processes or one or more child processes. \*\* [ change of the start time of the work period of a parent process / display / change and / after a predetermined time delay / the start time of the work period of a child process / the above-mentioned production-planning organization equipment / from this parent process ]

[0012] The above-mentioned planned organization equipment may change the work period (or quantity of production) of the parent process related with the child process, if the work period (or quantity of production) in a child process is changed.

[0013] The above-mentioned production-planning organization equipment may change the product term of the parent process, the quantity of production, or a production rate, if the number of the child processes related with a parent process is changed. The above-mentioned production-planning organization equipment may delete the child process related with the parent process, if the above-mentioned parent process is deleted.

[0014] The above-mentioned production-planning organization equipment makes the work period of the above-mentioned parent resources release, if shunting for which a parent process is made to suspend temporarily is directed, may bundle up the child process related with the parent process, and may shunt.

[0015] If it is matched with the quantity of production and the production rate of a product and expansion and contraction of the work period of two or more of the whole child processes are directed to two or more child processes relevant to one parent process, the work period of the above-mentioned child process may maintain the ratio of each work period, and may make the work period (or production rate of each child process) of each child process expand and contract collectively.

[0016] When the period of a parent process is shortened, you may make shortening of the period of the parent process from the start time of the child process relevant to the parent process to [ before the predetermined lead time ] suppress. The parent process which occupies the 1st parent resources with which the above-mentioned production-planning organization equipment produces an intermediate product, When there is a work period when the 2nd parent resources which can produce the above-mentioned intermediate product, and the child resources relevant to the parent resources are not occupied to the child process which produces the final product manufactured from the intermediate product If movement of a parent process which occupies the 1st parent resources to the work period is directed, the child process related with the 1st parent process may be put in block to the child resources relevant to the 2nd parent resources and the 2nd parent resources, and you may move.

[0017] The above-mentioned production-planning organization equipment may exchange the period of the child process related with each parent process, when exchange of a work period is directed to two parent processes of occupying a different work period in the same parent resources.

[0018] If the above-mentioned input section detects the directions which carry out front stuffing movement of the 2nd parent process till the end time of the 1st parent process when the 2nd parent process occupies the resources which set the specific period and the parent process occupied after the parent process of the above 1st, a related child process may also carry out front stuffing movement of the above-mentioned production-planning organization equipment collectively.

[0019] If the above-mentioned input section detects the directions which carry out back stuffing movement of the 1st parent process till the start time of the 2nd parent process when the 2nd parent process occupies the resources which set the specific period and the parent process occupied after the 1st parent process, a related child process may also move the above-mentioned production-planning organization equipment collectively.

[0020] The step on which this invention is a program which makes production planning



which consists of a child process which produces the final product manufactured from the parent process who produces an intermediate product to a computer, and its intermediate product compose, and production planning is displayed, it consists of a step to which change of production planning is made to direct, and a step on which this will be interlocked with, and a child process (or parent process) will be changed and displayed if a parent process is changed, and a child process is changed or --

[0021] This program may associate and display the child process which consists of the parent process which consists of information which starts the parent resources which produce a predetermined intermediate product in the above-mentioned step which gives an indication, and a work period which occupies the parent resources, information concerning the child resources which produce a predetermined final product, and a work period which occupies the child resources.

[0022] The information which this invention requires for an intermediate product, and the information which describes a parent process by the work period which occupies the parent resources which produce the intermediate product, and its parent resources, The information concerning a product, and the information which describes a child process by the work period which occupies the child resources which produce the product, and its child resources, What recorded the program which performs further the step which memorizes the information which associates the above-mentioned parent process and a child process on the record medium in which computer reading is possible may be used.

[0023] What recorded the information which associates the information concerning an intermediate product, the information which describes a parent process by the work period which occupies the parent resources which produce the intermediate product, and its parent resources, the information concerning a product, the information which describe a child process by the work period which occupies the child resources which produce the product, and its child resources, and the aforementioned parent process and a child process on the record medium in which computer reading is possible is sufficient as this invention.

[0024] this invention is realizable by the computer system equipped with a central processing unit (CPU), memory, display (CRT), the hard disk drive unit, the input unit (keyboard), the auxiliary input device (mouse), etc.

[0025] For example, the program for realizing this invention is installed in a hard disk drive unit, and is in the state of it once being read into memory by the central processing unit (CPU) if needed, and performing one by one.

[0026] A display means the display screen of display (CRT) and the input section in

which change of production planning is made to direct is realized by the keyboard or the mouse. Moreover, such a program is storable in storages, such as CD-ROM, a floppy disk, a magnetic disk, and a magnetic tape.

[0027]

[Embodiments of the Invention] Hereafter, the gestalt of operation of this invention is explained based on the drawing of drawing 33 from drawing 1 .

The production process of the synthetic resin set as the object of management of the production planning system which starts the gestalt of this operation at <process> drawing 1 is shown. every [ corresponding to the kind of synthetic resin in the production process of synthetic resin ] resources — a sequence 1, a sequence 2, and ... it is classified into Sequence n A sequence means a mass of production process from raw material to shipment of a final product. One sequence consists of a polymerization process of synthetic resin, a powder shipment process shipped as a final product, without processing the intermediate product generated by the polymerization process as it is, a granulation process which generates the pellet which is a final product from an intermediate product. A specific final product is manufactured from a specific intermediate product. For this reason, the relation (this is called parentage below) between a parent process and a child process between the polymerization process which produces an intermediate product, and the granulation process which produces a final product is.

<Hardware composition> drawing 2 is the hardware block diagram of the production planning system concerning the gestalt of this operation. This production planning system is equipped with the storage 5 which remembers a program execution result to be the mouse 4 for directing change of the computer 1 which performs the program of a production planning system, the display 2 which displays production planning, the keyboard 3 which performs an entry of data for change of production planning, and production planning displayed on display 2, and the printer 6 for outputting production planning, the content of data, etc.

The composition of the program performed by the computer 1 of the production planning system which starts the gestalt of this operation at <program composition> drawing 3 is shown. This program consists of a production-control program 8 which processes the production-control data accumulated at the database 7, and a display program 9 which displays on display 2 and deals with the input from a keyboard 3 or a mouse 4.

The data structure (henceforth data 10) of the production-control data which the production planning system which starts the gestalt of this operation at <data

composition> drawing 4 deals with is shown. This data structure is described in a LISP language. Data 10 are expressed with a CARD name, a CARD kind, an attribute name, and attribute value. A CARD name is the index of data 10. For example, when the data 10 concerned serve as parents of other data, one of the attribute value of other data becomes the CARD name of the data 10 concerned. That is, data 10 are referred by the CARD name.

[0028] A CARD kind is a kind of information indicated by data 10. In this production planning system, "work", a "polymerization", a "brand", a "sequence", "resources", etc. are prepared as a CARD kind. This CARD kind is used for the filter (narrow down) of data in data retrieval. For example, what is necessary is just to search this CARD kind, when data 10 exist so much and "work" is searched.

[0029] An attribute name is a name showing the kind of information indicated by data 10. Attribute value is a value of the information expressed with the attribute name. As attribute value, a numeric value, a character, a symbol, etc. are set up.

[0030] The production-control program 8 saves production-control data in a database 7 in the form of data 10. Or the production-control program 8 reads the production-control data of the form of data 10 from a database 7, and is made to display them on a display program 9.

[0031] Drawing 5 to drawing 7 is the example of composition of data 10. The polymerization data 20 and the brand data 21 are shown in drawing 5 as an example of product information. Product information means the information about an intermediate product or a final product.

[0032] The polymerization data 20 have the "polymerization name 1" which is a CARD name, the "polymerization" which is a CARD kind, and "@ producible resources" and "(sequence 1-polymerization sequence 2-polymerization)" which are the attribute value" which are an attribute. "The polymerization name 1" is an intermediate product produced at a polymerization process. "@ producible resources" and its attribute value show that the polymerization process of "a sequence 1" or the polymerization process of "a sequence 2" exists as resources which can produce "the polymerization name 1."

[0033] The brand data 21 have "@ producible resources", and "@ polymerization", it is "(sequence 1-granulation sequence 2-granulation)" as attribute value" and the "polymerization name 1" as a "brand" and an attribute as a CARD kind with "the brand name 1" as a CARD name. The brand name 1 is a final product produced at a granulation process. "@ producible resources" and its attribute value mean that a "sequence 1-granulation" or a "sequence 2-granulation" exists as resources which

can produce "the brand name 1." The attribute value of "@ polymerization" means that "the polymerization name 1" exists as a parent product of "the brand name 1."

[0034] A parentage is connected with the CARD name of parent data by the attribute value of "@ polymerization" which is the attribute of child data. Since "the polymerization name 1" is used in common with the attribute value of "@ polymerization" which is the attribute of the brand data 21, a production-control program can recognize the parentage of the polymerization data 20 and the brand data 21 to be the CARD name of the polymerization data 20.

[0035] Moreover, "" (sequence 1-granulation sequence 2-granulation) which is the attribute value of @ producible resources"" of the brand data 21 is held in order of the start time. Therefore, the process of a "sequence 2-granulation" begins simultaneous with the process of a "sequence 1-polymerization" beginning, or after that.

[0036] As an example of the data composition of resources information, the sequence data 25 and the resources data 26 are shown in drawing 6 . Resources information means the information about the resources for producing an intermediate product and a final product.

[0037] The sequence data 25 have the "sequence 1" which is a CARD name, the "sequence" which is a CARD kind, "@ polymerization" which is an attribute, the "sequence 1-polymerization" which is the attribute value, "@ powder shipment" which is an attribute, the "sequence 1-powder" which is the attribute value, "@ granulation" which is an attribute, and the "sequence 1-granulation" which is the attribute value. The sequence data 25 express a bird clapper from the resources with which "a sequence 1" is used for a polymerization, the resources used for powder shipment, and the resources used for a granulation. The attribute of "a sequence 1" and its attribute value mean that "the sequence 1" has the polymerization process, the powder shipment process, and the granulation process.

[0038] The resources data 26 have "sequence 1-A" which is a CARD name, the "resources" which are CARD kinds, "@ sequence" which is an attribute, and the "sequence 1" which is attribute value. The attribute and attribute value of the resources data 26 mean that "a sequence 1" exists as a sequence of "sequence 1-A" which is resources.

[0039] As an example of the data composition of work information, the parent work data 30 and the child work data 31 are shown in drawing 7 . Work information means the information about each process, such as a polymerization process and a powder shipment process.

[0040] The parent work data 30 are the work information on a parent process. The

parent work data 30 have "@ quantity of production", and "@ parent work" and "@ child work" as an attribute. [ "@ resources", "@ product", "the time of @ opening day" and "@ end time", and ] [ "@ product term", and ] [ "@ production rate", and ] [0041] "@ resources" shows the resources used by the work of the parent process. By the parent work data 30, "@ resources" has "sequence 1-A" as attribute value. "@ product" shows the product produced at the parent process. By the parent work data 30, "@ product" has "the polymerization name 1" as attribute value.

[0042] At "the time of @ opening day", the time of the opening day of the work of the parent process is shown. By the parent work data 30, it has "10:10 10 seconds on December 20, 1999" as attribute value at "the time of @ opening day."

[0043] "@ end time" shows the finish time of the work of the parent process. By the parent work data 30, "@ end time" has "10:10 10 seconds on December 30, 1999" as attribute value.

[0044] "@ product term" shows the period which production of the work of the parent process takes. By the parent work data 30, "@ product term" has "ten days" as attribute value. "@ production rate" shows the period which production per amount of numbers of unit of the product (here "polymerization name 1") produced at the parent process takes. In the parent work 30, it has "@ production rate" in "one day/t" as attribute value. "@ quantity of production" shows the amount of the product produced at the parent process. "@ quantity of production" has "10t" as attribute value.

[0045] "@ parent work" shows the parent work of the parent work. However, by the parent work data 30, since a thing called the parent work of parent work does not exist, nothing is set up. "@ child work" shows the child work of the parent work. In the parent work 30, it has "it is " (work 2 work 3 work 4) as attribute value of @ child work".

[0046] The turn of the attribute value of "@ child work" shows the turn of work. Therefore, work is done in order of work 2, work 3, and work 4. In the child work data 31, it is the work information on a child process. The process which generates a final product using the intermediate product generated by the work shown by the parent work data 30 is defined as the child work data 31.

[0047] The CARD name of the child work data 31 is work 2. The composition of the child work data 31 is the same as that of the parent work data 30. However, by the child work data 31, "work 1" is held as attribute value of "@ parent work." This shows that the parent work of "work 2" is "work 1." Since the child work of child work does not exist in "@ child work" of the child work data 31, nothing is set up. Thus, the parentage during work is realized.

[0048] Drawing 8 is work information which resources hold. Work information says the information on the work done in the process of each sequence 1. Work information has "resources" as a CARD kind with a "sequence 1-granulation" as a CARD name. Work information has "@ sequence" and "@ work" as an attribute. The work information in this case is information which shows the resources used for the granulation process of a sequence 1. Moreover, the "resources" in this case is facilities used for a granulation process.

[0049] "@ sequence" shows the sequence to which these resources belong. In this case, it has "the sequence 1" as attribute value. "@ work" shows the work done using the resources. In this case, it has "(work 2 work 3 work 4)" as attribute value. This means that these resources are used for work 2, work 3, and work 4 in order.

<Display> drawing 9 is the operation screen of the production control system displayed on display 2 by the display program 9. An operation screen visualizes work information according to the period when resources are occupied according to each process, and the kind of resources, and is realized by GUI (graphical user interface).

[0050] An operation screen displays the Gantt chart display 42 in the center, displays the resources display 41 which expresses the kind of resources to the left-hand as a vertical axis, and displays the calendar display 40 on the upper part of the Gantt chart display 42 as a time-axis. An operation screen displays further the message indicator section 44 which displays various kinds of messages, such as an error message, on the lower part of the Gantt chart display 42, and each functional operation specification part 46.

[0051] The various functional displays 46 have the feature button 45 for a user specifying change of a work plan. A feature button 45 is a button for choosing functions, such as movement of work. Move button 45a, evacuation button 45b, deletion button 45c, package speed change button 45d, pre-exchange button 45e, back \*\* button 45f, and front \*\* button 45g are prepared as a feature button 45. For example, in moving the work schedule of the parent work A1 back, it chooses move button 45a among feature buttons 45.

[0052] A calendar display displays a date and time. The resources display 41 displays a sequence and the kind of resources. On the Gantt chart display 42, the parent work A1 and the parent work A2 are displayed as work which occupies the resources A of a sequence 1, and the child work C1-C8 is displayed as work which occupies the resources C of a sequence 1. Here, when the parent work A1 is taken for an example, the parent work A1 shows that work is done from February 10 to February 13 using the resources A of a sequence 1.

It is vacant in <change process of production planning> (move operation to empty period of work) drawing 10 , and move operation of the work to a period is shown. In drawing 10 , (\*\*) is a screen before work movement, and (\*\*) is a screen after work movement (in drawing 12 -19, (\*\*) is a screen before operation like the following, and (\*\*) is a screen after operation).

[0053] If a user chooses move button 45a with a mouse 4, although it is not shown in drawing, the configuration of a mouse cursor changes. At this time, a display program 9 will be in a waiting state about which work is chosen. A user chooses the parent work A2 with a drag in this state. It says holding the information until a drag acquires the information for operation by choosing the candidate for operation (for example, work) by the mouse cursor and it releases a mouse 4 (it is below the same).

[0054] A display program 9 acquires the information on "being @ end time and @ child work group at the time of @ resources, @ sequence, and @ opening day" of the parent work A2 with a drag. Next, a user moves and drops a mouse cursor with a movement place, with the parent work A2 dragged. Operation in which drops release mouse button at a desired movement place is said. A display program 9 changes the information currently held with a drag corresponding to movement place information while acquiring movement place information from the position of a movement place, if drops are detected.

[0055] With the drops to a movement place, a display program 9 acquires the information at "the time of @ resources, @ sequence, and @ opening day" from the position of a movement place, and only the difference at "the time of @ opening day" of a moved material moves back from the "time of @ opening day" of a movement place, and it displays the child work relevant to parent work.

(Move operation to the non-opening period of work) Move operation of the work to a non-opening period is shown in drawing 11 . If a user chooses move button 45a with a mouse 4, the configuration of a mouse cursor will change. At this time, a display program 9 will be in the waiting state of which work to choose. A user chooses the parent work A2 with a drag in this state.

[0056] If a user moves and drops a mouse cursor with a movement place, unlike the case where it moves to an empty period, the parent work A3 and the child work B3, C9, and C10 which are already due to overlap exist in the position of a movement place. When a user drops, while a display program 9 changes the information currently held with a drag, it moves back a moved part of the parent work A2, and the parent work A3 and the child work B3, C9, and C10 are displayed. Next, the parent work A2 and its child work as well as the move operation to the empty period of work are moved to the

parent work A3 front.

(Move operation to the non-opening period of evacuation work) Move operation of evacuation work is shown in drawing 12 and drawing 13 . The work evacuated temporarily [ evacuation work ] from the Gantt chart display 42 to on the evacuation work window 50 is said. In the evacuation work window 50, it is a window for holding the work evacuated from the Gantt chart display 42.

[0057] When returning evacuation work to below from on the evacuation work window 50 at the Gantt chart display 42, it divides and explains to two kinds when the time of other work programs not being contained after the work which returned, and other work programs are contained.

[0058] [When there is no next schedule in the influenced parent work], move operation of evacuation work in case there is no next schedule in the parent work which receives influence in drawing 12 is shown. If a user chooses evacuation button 45b with a mouse 4, the evacuation work window 50 will be displayed and the configuration of a mouse cursor will change. At this time, a display program 9 will be in a waiting state about which work is chosen. In this example, the child work C20 evacuated to the evacuation work window 50 by interruption of a special express article etc. exists, and only the information on a work period exists in the evacuated child work C20.

[0059] When a user drags the child work C20 and drops with a movement place, a display program 9 acquires the information at "the time of a @ resources @ sequence @ opening day" on a movement place, and hands over information to the production-control program 8.

[0060] The production-control program 8 adds the acquired information to the work information on the child work C20. Next, the production-control program 8 re-calculates the product term of the parent work A2, and adds the child work C20 to information. A display program 9 moves the child work C7 and C8 back by the work period of the child work C20. At this time, the child work C20 is added to "@ work" of resources information.

[0061] [When the influenced parent work has a next schedule], move operation of evacuation work in case the parent work which receives influence in drawing 13 has a next schedule is shown. If a user chooses evacuation button 45b with a mouse 4, the evacuation work window 50 will be displayed and the configuration of a mouse cursor will change. At this time, a display program 9 will be in the waiting state of which work to choose. A user chooses the child work C20 of the evacuation work window 50 with a drag in this state.



[0062] If a user moves and drops a mouse cursor with a movement place, the child work C20 will be assigned, the product term of the parent work A2 will be re-calculated, and a display program 9 will move the existing child work C7-C10 and B3 back. At this time, the child work C20 is added to "@ work" of resources information like the case where there is no next schedule in the influenced parent work.

(Deletion operation of work) Deletion operation of work is shown in drawing 14 . If a user chooses deletion button 45c with a mouse 4, the configuration of a mouse cursor will change. At this time, a display program 9 will be in a waiting state about which work is chosen. A user chooses the parent work A2 with a mouse 4 in this state. At this time, a display program 9 acquires the information on the parent work A2.

[0063] The production-control program 8 deletes the child work B3, C5-C8 which is related child work from the work information on the parent work A2. Next, a production-control program deletes the work information of the parent work A2 itself, and deletes the child work C5-C8 from "@ work" of resources information further.

(Primary evacuation operation of work) Operation of primary evacuation of work is shown in drawing 15 . If a user chooses evacuation button 45b with a mouse 4, the evacuation work window 50 will be displayed and the configuration of a mouse cursor will change. At this time, a display program 9 will be in a waiting state about which work is chosen. If a user chooses the parent work A2 with a drag, a display program 9 will acquire the information on "@ child work" of the parent work A2. Next, a display program 9 displays the child work C5-C8 which is related child work on the evacuation work window 50. Furthermore, a display program 9 deletes the child work C5-C8 from "@ work" of resources information while deleting the parent work A2.

(Package speed change operation of related child work) Operation of package speed change of work is shown in drawing 16 . If a user chooses package speed change button 45d with a mouse 4, the configuration of a mouse cursor will change. At this time, a display program 9 will be in a waiting state about which work is chosen. If a user clicks and extends the edge of the parent work A2 in this state, "@ end time" of the work information on the parent work A2 will be changed. Furthermore, a display program 9 acquires the information on "@ child work" from the parent work A2. And a display program 9 changes the period of C5-C8 which are related child work according to the quantity-of-production ratio of child work. Here, a change of resources information is not made.

(Speed change operation of parent work) Speed change operation of parent work is shown in drawing 17 . If a user chooses a non-illustrated speed change button with a

mouse 4, the configuration of a mouse cursor will change. At this time, a display program 9 will be in a waiting state about which work is chosen. If a user clicks and contracts the edge of the parent work A2 by this state, a display program 9 will acquire the information on "being a @ end time @ child work group at the time of a @ resources @ sequence @ opening day" of the parent work A2.

[0064] The production-control program 8 judges whether in consideration of a lead time, the end time of the parent work A2 can be changed to be the end time of the tail of the child work group of the parent work A2, and when impossible, it displays an error message. On the other hand, in being possible, the production-control program 8 changes the end time and the production rate of the parent work A2.

(Other resources move operation of work) Operation of other resources movement of work is shown in drawing 18 . If a user chooses move button 45a with a mouse 4, the configuration of a mouse cursor will change. At this time, a display program 9 will be in a waiting state about which work is chosen. If a user chooses the parent work A2 with a drag, a display program 9 will acquire the information on "being a @ end time @ child work group at the time of a @ resources @ sequence @ opening day" of the parent work A2. Next, if a user moves and drags a mouse cursor in a different resources group like the drawing 18 (b), a display program 9 will acquire the information at "the time of a @ resources @ sequence @ opening day" from the position of a movement place.

[0065] It judges whether the product of parent work and all the products of child work can produce the production-control program 8 in the resources of a movement place, and an error message is displayed when impossible. On the other hand, in being possible, the production-control program 8 moves the child work C5-C8 relevant to the parent work A2. At this time, the production-control program 8 changes "it being @ end time at the time of a @ resources @ opening day". [ of the child work C5-C8 ] Next, the production-control program 8 deletes the parent work A2 from "@ work" of the sequence 1 of resources information data, and adds the parent work A2 to "@ work" of a sequence 2.

(Pre-exchange work of work) Operation of pre-exchange of work is shown in drawing 19 . If a user chooses pre-exchange button 45e with a mouse 4, the configuration of a mouse cursor will change. At this time, a display program 9 will be in a waiting state about which work is chosen. If a user chooses the parent work A3 with a mouse 4, a display program 9 will acquire the information on "being a @ end time @ child work group at the time of @ opening day" of the parent work A2 which is the work in front of the parent work A3.

[0066] A display program 9 directs the acquired pre-exchange of the parent work A2 and the parent work A3 to the production program 8. The production-control program 8 is changed to "@ opening day attribute value" when acquiring the attribute value at "the time of @ opening day" of the parent work A3, and updates the attribute value of "@ end time" of the parent work A3. At this time, the attribute value at "the time of @ opening day" of the parent work A2 is updated by the attribute value of "@ end time" of the updated parent work A3.

[0067] Parent work data 30a of the parent work A2 just before pre-exchange is performed to drawing 20 , and child work data 31a of the child work C5 just before pre-exchange is performed are shown. Parent work data 30b of the parent work A2 immediately after performing pre-exchange to drawing 21 and child work data 31b of the child work C5 immediately after performing pre-exchange are shown.

[0068] At this time, the production-control program 8 updates "the time of @ opening day" and "@ end time" of parent work data 30a and child work data 31a in the state of the drawing 21 (a) and the drawing 21 (b) from the state of the drawing 20 (a) and the drawing 20 (b).

[0069] Specifically, about the parent work A2, the production-control program 8 updates a start time from 11:00 to 15:00, and updates a finish time from 15:00 at 19:00. Moreover, similarly, about the child work C5, the production-control program 8 updates a start time from 12:00 to 15:00, and updates a finish time from 13:00 at 16:00. With this updating, a display program 9 updates the Gantt chart display 42 so that it may express to the drawing 19 (b).

(After [ work ] stuffing operation) Operation of the final stage is shown in drawing 22 after work. If a user chooses back \*\* button 45f with a mouse 4, the configuration of a mouse cursor will change. At this time, a display program 9 will be in a waiting state about which work is chosen. If a user chooses the parent work A2, a display program 9 will acquire the information on "being a @ end time @ child work group at the time of @ opening day" of the parent work A2, and the information at "the time of @ opening day" on the parent work A3 which is the work immediately after the parent work A2.

[0070] Among the work information on the parent work A2, the attribute value of "@ end time" is updated so that it may become the attribute value at "the time of @ opening day" of the parent work A3, and as for the production-control program 8, the attribute value at "the time of @ opening day" also updates it corresponding to it. With this updating, a display program 9 updates the Gantt chart display 42 so that it may express to the drawing 22 (b).

(Front stuffing operation of work) Operation of front stuffing of work is shown in

drawing 23 . If a user chooses front \*\* button 45g with a mouse 4, the configuration of a mouse cursor will change. At this time, a display program 9 will be in a waiting state about which work is chosen. If a user chooses the parent work A2, a display program 9 will acquire the information on "being a @ end time @ child work group at the time of @ opening day" of the parent work A2, and the information on "@ end time" of the parent work A1 which is the last work.

[0071] The production-control program 8 is updated so that it may become the attribute value of "@ end time" of the parent work A1 which acquired the attribute value at "the time of @ opening day" among the work information on the parent work A2. With this updating, a display program 9 updates the Gantt chart display 42 so that it may express to the drawing 23 (b).

[0072] Hereafter, according to the drawing of drawing 33 , processing of the production-control program 8 shown in drawing 9 and a display program 9 is explained from drawing 24 . A computer 1 offers an above-mentioned function by performing this production-control program 8 and display program 9.

The whole procedure of the production-control program 8 and a display program 9 is shown in <procedure of production control> drawing 24 . A computer's 1 starting of the production-control program 8 reads a schedule engine and master data (S2101). A schedule engine is a program component which passes the result which read data 10 and was analyzed to a display program 9. Master data are an initial data required for the production-control program 8. There are a lead time of the parent work of a sequence and child work, a production rate of each process, etc. in master data.

[0073] Next, a computer 1 displays an initial screen (S2102). The new planning and existing planned change, a master maintenance, and the button of an end are displayed on an initial screen. A computer 1 waits to choose one of buttons (S2103).

[0074] When the button of new planning is chosen (S2104), a computer 1 displays a new planning directions screen (S2105). The new planning screen has non-illustrated the data selection section and an end button. If an end button is pushed (in the case [ The judgment of S2106 ] of Y), a computer 1 will return control to a button selection screen (\*\*).

[0075] When not terminating processing (in the case [ The judgment of S2106 ] of N), a computer 1 makes a user specify the last planning result of production request data in the non-illustrated data selection section. Production request data mean the data about the product specification with which production is demanded of the kind of an intermediate product or final product, time for delivery, etc.

[0076] Then, a computer 1 reads the result drawn up last time [ of the specified

production request data ] (S2107), and displays a Gantt chart (S2112). When the button of the existing planned change is chosen (S2108), a computer 1 displays the existing planned change screen (S2109). The existing planned change screen has non-illustrated the planned selection section and an end button. If an end button is pushed (in the case [ The judgment of S2110 ] of Y), a computer 1 will return control to a button selection screen (\*\*).

[0077] When not terminating processing (in the case [ The judgment of S2110 ] of N), a computer 1 makes a user specify the last planning result of the existing plan. A computer 1 reads the last planning result of the specified existing plan (S2111), and displays a Gantt chart (S2112).

[0078] When the button of a master maintenance is chosen (S2120), a computer 1 displays a master maintenance screen display (S2121). The master maintenance screen has non-illustrated the master maintenance selection section and an end button. If an end button is pushed (in the case [ The judgment of S2122 ] of Y), a computer 1 will return control to a button selection screen (\*\*). When not terminating processing (in the case [ The judgment of S2123 ] of N), a computer 1 processes addition, change, etc. in master maintenance processing (S2123). Here, it says that a master maintenance adds and changes the value of master data.

[0079] A computer 1 waits for user operation, where the Gantt chart display 42 is displayed (S2112). this time — each functional operation specification part 46 — preservation processing (S2114), a restrictions check (S2115), planning and adjustment (S2116), dialog correction processing (S2117), a verification graph (S2118), and the various buttons of a monthly quantity-of-production check (S2119) — a display — now, it puts in

[0080] Preservation processing means saving change produced to master data, production request data, etc. by the time the button of preservation processing (S2114) was pushed from button selection (S2103).

[0081] The check of whether a restrictions check can work to the restrictions (for example, restrictions of time for delivery etc.) which the user set up etc. is said. A verification graph is a graph for confirming whether for example, do not verify the actual production of a certain product, or the quantity of production exceeds the tank capacity of a plant.

[0082] Selection of one of the various above-mentioned buttons judges the button with which it was chosen on the screen (S2113). Next, a computer 1 shifts to each processing (S2112–S2119). When the button with which it was chosen on the screen is an end button, a display program 9 and the production-control program 8 are

completed.

[0083] Drawing 32 is used from drawing 25 below, and processing when dialog correction processing (S2117) is chosen in button selection (S2113) of drawing 24 is described in detail. The procedure of dialog correction processing is shown in drawing 32 from drawing 25 . A computer 1 displays the screen of drawing 9 that dialog correction processing is chosen, and it waits to choose either of the feature buttons 45 (S2201). (S2117)

[0084] Drawing 25 is drawing showing the flow of processing at the time of choosing a move button. A user's selection of move button 45a changes the configuration of a mouse cursor (S2203). (S2202) At this time, a display program 9 will be in a waiting state about which work is chosen. If the work for movement is chosen (S2204), a display program 9 will judge whether the work for movement is assigned on Gantt chart 42, and whether the work for movement exists on the evacuation work window 50 (S2205).

[0085] When the work for movement exists on the evacuation work window 50, as for a display program 9, a user waits to specify a movement place (S2206). On Gantt chart 42, when the work for movement is allotment ending (in the case [ The judgment of S2205 ] of Y), as for a display program 9, a user waits to specify a movement place (S2207).

[0086] It judges whether the production-control program 8 can move the work for movement to the movement place specified by the user (S2208). When it can move (in the case [ The judgment of S2208 ] of Y), as for the production-control program 8, the work for movement judges whether you are the parents of a parentage (S2209). If the work for movement is parents (in the case [ The judgment of S2209 ] of Y), while performing move processing of the work for [ the ] movement (S2210), move processing of the related child work of the work is performed (S2211). In addition, drawing 33 describes a series of work (S2216) of move processing (S2210) of the work for movement, and move processing (S2211) of related child work in detail.

[0087] If the work for movement is the child of a parentage (in the case [ The judgment of S2209 ] of N), move processing of the work will be performed (S2213). After move processing (S2211) of related child work or move processing (S2213) of child work is completed, the message of normal termination is displayed (S2214) and control moves from work to the judgment of whether to carry out continuation movement (S2215).

[0088] When the work for movement is not able to move (for example, when it is going to move to the part which it is not on the Gantt chart display 42 etc.) (in the case

[ The judgment of S2208 ] of N), a display program 9 displays an error message (S2212), and moves from work to the judgment of whether to carry out continuation movement (S2215). In the judgment of whether to carry out continuation movement of the work, a display program 9 displays the non-illustrated alert message of whether to carry out continuation movement, and demands judgment from a user.

[0089] (When a user makes a judgment which carries out continuation movement of the work, and the judgment of S2215 is Y), a display program 9 will be in the state waiting for selection for movement. (When a user judges that continuation movement of the work is not carried out, and the judgment of S2215 is N), move processing is completed, a computer 1 displays the screen of drawing 9 , and it waits to choose either of the feature buttons 45 (S2201).

[0090] Drawing 26 is drawing showing the flow of processing at the time of choosing deletion button 45c. A user's selection of deletion button 45c changes the configuration of a mouse cursor (S2302). (S2301) At this time, a display program 9 will be in a waiting state about which work is chosen.

[0091] Selection of the work for deletion judges whether the production-control program 8 can delete work (S2304). (S2303) When it cannot delete (in the case [ The judgment of S2304 ] of N), a display program 9 displays an error message (S2308), and moves from work to the judgment of whether to carry out continuation deletion (S2311).

[0092] When it can delete (in the case [ The judgment of S2304 ] of Y), control moves [ the work for deletion ] to the judgment of being parent work (S2305). When the work for deletion is not parent work (in the case [ The judgment of S2305 ] of N), the production-control program 8 deletes the work for deletion (S2309). \*\* [ an end of deletion / display / a normal termination message / a display program 9 ] (S2310)

[0093] the case (in the case [ The judgment of S2305 ] of Y) where the work for deletion is parent work -- the production-control program 8 -- the deletion of parent work -- carrying out (S2306) -- deletion of the related child work is performed (S2307)

[0094] After processing is completed, a display program 9 displays a normal termination message (S2310), and moves from work to the judgment of whether to carry out continuation deletion (S2311). In the judgment of whether to carry out continuation deletion of the work, a display program 9 displays the non-illustrated alert message of whether to carry out continuation movement, and demands judgment from a user.

[0095] (When a user makes a judgment which carries out continuation movement of

the work, and the judgment of S2311 is Y), a display program 9 will be in the state waiting for selection for deletion. Deletion is completed (when a user judges that continuation movement of the work is not carried out, and the judgment of S2311 is N). Then, a computer 1 displays the screen of drawing 9 and it waits to choose either of the feature buttons 45 (\*\*).

[0096] Drawing 27 is drawing showing the flow of processing at the time of choosing evacuation button 45b. A user's selection of evacuation button 45b changes the configuration of a mouse cursor (S2402). (S2401) At this time, a display program 9 will be in a waiting state about which work is chosen.

[0097] Selection of the work for evacuation judges whether the production-control program 8 can evacuate work (S2404). (S2403) When it cannot evacuate (in the case [ The judgment of S2404 ] of N), a display program 9 displays an error message (S2409), and moves from work to the judgment of whether to carry out continuation evacuation (S2411).

[0098] When it can evacuate, in Y, control moves [ the work) and for evacuation ] to the judgment of being parent work by the judgment of (S2404 (S2405). (When the work for evacuation is not parent work, and the judgment of S2405 is N), the production-control program 8 performs evacuation processing of the work for evacuation (S2410). After processing finishes, a display program 9 displays a normal termination message (S2408), and moves from work to the judgment of whether to evacuate continuously (S2411).

[0099] (When the work for evacuation is parent work, and the judgment of S2405 is Y), the production-control program 8 deletes the work (S2406), and carries out evacuation processing of the child work relevant to the work (S2407). After evacuation processing is completed, a display program 9 displays a normal termination message (S2408), and moves from work to the judgment of whether to carry out continuation evacuation (S2411). In the judgment of whether to carry out continuation evacuation of the work, a display program 9 displays the non-illustrated alert message of whether to carry out continuation movement, and demands judgment from a user.

[0100] (When a user makes a judgment which carries out continuation evacuation of the work, and the judgment of S2411 is Y), a display program 9 will be in the state waiting for selection for evacuation. Evacuation processing is completed (when a user judges that continuation evacuation of the work is not carried out, and the judgment of S2411 is N). Then, a computer 1 displays the screen of drawing 9 and it waits to choose either of the feature buttons 45 (\*\*).

[0101] Drawing 28 is drawing showing the flow of processing at the time of choosing



package speed change button 45d. A user's selection of package speed change button 45d changes the configuration of a mouse cursor (S2502). (S2501) At this time, a display program 9 will be in a waiting state about which work is chosen.

[0102] A user's selection of the work for change judges whether the production-control program 8 can be changed (S2504). (S2503) When it cannot change (in the case [ The judgment of S2504 ] of N), a display program 9 displays an error message (S2507), and moves from work to the judgment of whether to make a continuation change (S2508).

[0103] When the work for change can be changed (in the case [ The judgment of S2504 ] of Y), the production-control program 8 performs speed change processing of the work (S2505). After processing is completed, a display program 9 displays a normal termination message (S2506), and moves from work to the judgment of whether to make a continuation change (S2508). In the judgment of whether to make a continuation change of the work, a display program 9 displays the non-illustrated alert message of whether to carry out continuation movement, and demands judgment from a user.

[0104] (When a user judges that a continuation change of the work is made, and the judgment of S2508 is Y), a display program 9 will be in the state waiting for selection for deletion. Change processing is completed (when a user judges that a continuation change of the work is not made, and the judgment of S2508 is N). Then, a computer 1 displays the screen of drawing 9 and it waits to choose either of the feature buttons 45 (\*\*).

[0105] Drawing 29 is drawing showing the flow of processing when a non-illustrated speed change button is chosen. A user's selection of a speed change button changes the configuration of a mouse cursor (S2602). (S2601) At this time, a display program 9 will be in a waiting state about which work is chosen.

[0106] A user's selection of the work for deletion judges whether the production-control program 8 can change the work for change (S2604). (S2603) When it cannot change (in the case [ The judgment of S2604 ] of N), a display program 9 displays an error message (S2608), and moves from work to the judgment of whether to make a continuation change (S2610).

[0107] When the work for change can be changed, as for) and the production-control program 8, in Y, the work for change judges whether it is parent work by the judgment of (S2604 (S2605). When the work for change is not parent work, the production-control program 8 performs change processing of the work (S2609). (when the judgment of S2605 is N) After processing is completed, a display program 9

displays a normal termination message (S2607), and moves from work to the judgment of whether to make a continuation change (S2610). In the judgment of whether to make a continuation change of the work, a display program 9 displays the non-illustrated alert message of whether to make a continuation change, and demands judgment from a user.

[0108] (When a user makes a judgment which makes a continuation change of the work, and the judgment of S2610 is Y), a display program 9 will be in the state waiting for selection for work. Change processing is completed (when a user judges that a continuation change of the work is not made, and the judgment of S2610 is N). Then, a computer 1 displays the screen of drawing 9 and it waits to choose either of the feature buttons 45 (\*\*).

[0109] Drawing 30 is drawing showing the flow of processing when a pre-exchange button is chosen. A user's selection of pre-exchange button 45e changes the configuration of a mouse cursor (S2702). (S2701) At this time, a display program 9 will be in a waiting state about which work is chosen.

[0110] A user's selection of the work for pre-exchange judges whether the pre-exchange of the work for pre-exchange is possible for the production-control program 8 (S2704). (S2703) When pre-exchange is impossible (in the case [ The judgment of S2704 ] of N), a display program 9 displays an error message (S2709), and it moves from it to the judgment of whether to exchange work before continuation (S2711).

[0111] When pre-exchange is possible for the work for pre-exchange, as for) and the production-control program 8, in Y, the work for pre-exchange judges whether it is parent work by the judgment of (S2704 (S2705). (When the work for pre-exchange is not parent work, and the judgment of S2705 is N), the pre-exchange work of the work is done (S2710). After processing is completed, a display program 9 displays a normal termination message (S2708), and it moves from it to the judgment of whether to exchange work before continuation (S2711).

[0112] (When the work for pre-exchange is parent work, and the judgment of S2705 is Y), the production-control program 8 performs the front message exchange of the work (S2706), and the front message exchange of the child work relevant to the work is performed (S2707). After the front message exchange is completed, a display program 9 displays a normal termination message (S2708), and it moves from it to the judgment of whether to exchange work continuously (S2711). In the judgment of whether to exchange work before continuation, a display program 9 displays the non-illustrated alert message of whether to carry out continuation movement, and

demands judgment from a user.

[0113] (When a user judges that work exchanges before continuation, and the judgment of S2711 is Y), a display program 9 will be in the state waiting for selection for pre-exchange. (When a user judges that work does not exchange before continuation, and the judgment of S2711 is N), the front message exchange is completed. Then, a computer 1 displays the screen of drawing 9 and it waits to choose either of the feature buttons 45 (\*\*).

[0114] Drawing 31 is drawing showing the flow of processing at the time of choosing back \*\* button 45f. A user's selection of back \*\* button 45f changes the configuration of a mouse cursor (S2802). (S2801) At this time, a display program 9 will be in a waiting state about which work is chosen.

[0115] A user's selection of the work of back \*\*\*\*\* judges whether back \*\* is possible for the production-control program 8 (S2804). (S2803) When back \*\* is impossible (in the case [ The judgment of S2804 ] of N), a display program 9 displays an error message (S2809), and it moves from it to the judgment of whether to \*\* work after continuing (S2811).

[0116] When back \*\* is possible for the work of back \*\*\*\*\* (in the case [ The judgment of S2804 ] of Y), as for the production-control program 8, the work judges that it is parent work (S2805). (When work is not parent work, and the judgment of S2805 is N), as for the production-control program 8, \*\*\*\*\* is performed after the work (S2806). After processing is completed, a display program 9 displays a normal termination message (S2808), and it moves from it to the judgment of whether to back-\*\* work continuously (S2811).

[0117] (When the work of back \*\*\*\*\* is parent work, and the judgment of S2805 is Y), the production-control program 8 performs \*\*\*\*\* after the parent work (S2806), and \*\*\*\*\* is performed after the child work relevant to the parent work (S2807). After back \*\*\*\*\* is completed, a display program 9 displays a normal termination message (S2808), and it moves from it to the judgment of whether to \*\* work after continuing (S2811). In the judgment of whether to \*\* work after continuing, a display program 9 displays the alert message of whether to \*\* after non-illustrated continuation, and demands judgment from a user.

[0118] (When a user judges that work \*\* after continuing, and the judgment of S2811 is Y), a display program 9 will be in the state waiting for selection of back \*\*\*\*\*. Back \*\*\*\*\* is completed (when a user judges that work does not \*\* after continuing, and the judgment of S2811 is Y). Then, a computer 1 displays the screen of drawing 9 and it waits to choose either of the feature buttons 45 (\*\*).

[0119] Drawing 32 is drawing showing the flow of processing when front \*\* button 45g is chosen. A user's selection of a front \*\* button changes the configuration of a mouse cursor (S2902). (S2901) At this time, a display program 9 will be in a waiting state about which work is chosen. A user's selection of the work of front \*\*\*\*\* judges whether front \*\* of the production-control program 8 is possible for front \*\*\*\*\* work (S2904). (S2903)

[0120] When front \*\* is impossible for the work of front \*\*\*\*\* (in the case [ The judgment of S2904 ] of N), an error message is displayed (S2909) and it moves to the judgment of whether to \*\* work before continuation (S2911). When front \*\* is possible for the work of front \*\*\*\*\* (as for) and the production-control program 8, in Y, front \*\*\*\*\* work judges whether it is parent work by the judgment of (S2904 (S2905).

[0121] (When the work of front \*\*\*\*\* is not parent work, and the judgment of S2905 is N), the production-control program 8 performs front \*\*\*\*\* of the work (S2906). After processing is completed, a display program 9 displays a normal termination message (S2908), and it moves from it to the judgment of whether to front-\*\* work continuously (S2911).

[0122] (When the work of front \*\*\*\*\* is parent work, and the judgment of S2905 is Y), the production-control program 8 performs front \*\*\*\*\* of the parent work (S2906), and front \*\*\*\*\* of the child work relevant to the parent work is performed (S2907). After front \*\*\*\*\* is completed, a display program 9 displays a normal termination message (S2908), and it moves from it to the judgment of whether to front-\*\* work continuously (S2911). In the judgment of whether to \*\* work before continuation, a display program 9 displays the alert message of whether to \*\* before non-illustrated continuation, and demands judgment from a user.

[0123] (When a user makes a judgment which \*\* work before continuation, and the judgment of S2911 is Y), a display program 9 will be in the state waiting for selection of front \*\*\*\*\* . Front \*\*\*\*\* is completed (when a user judges that work does not \*\* before continuation, and the judgment of S2911 is Y). Then, it waits for a computer 1 to display the screen of drawing 9 and for either of the feature buttons 45 to choose it (\*\*).

[0124] Drawing 33 shows a series of work (S2216) of the parent work move processing (S2210) in drawing 25 , and move processing (S2211) of related child work. When the work for [ specified by the user ] movement is parent work (in the case [ The judgment of S2209 ] of Y), a display program 9 acquires the information on the work (S3001). Next, a display program 9 acquires the information on a movement place

(S3002). When there is work of a movement place (in the case [ The judgment of S3003 ] of Y), a display program 9 acquires the parent information before movement (S3009).

[0125] At this time, the production-control program 8 performs calculation between diakinesis stages (S3010), and the information on candidate parent work is updated (S3011). Next, it judges whether the production-control program 8 has the child work of renewal of un-(S3012). When there is child work of renewal of un-, in Y, the information on) and related child work is updated by the judgment of (S3013 (S3013), and it returns to the judgment of whether there is any child work of renewal of un-(S3012).

[0126] When there is no child work of renewal of un-(in the case [ The judgment of S3012 ] of N), it judges whether the production-control program 8 has the work of a movement place (S3008). When there is work of a movement place, in Y, the parent information before) and movement is acquired by the judgment of (S3008 (S3009). When there is no work of a movement place, in N, processing is moved to renewal of the information on) and the target parent work by the judgment of (S3008 (S3004).

[0127] When there is no work of a movement place (in the case [ The judgment of S3003 ] of N), candidate parent work is moved (S3004). It judges whether the production-control program 8 has the child work of renewal of un-in candidate parent work (S3005). When there is renewal child work of un-, in Y) and the production-control program 8 update the information on related child work by the judgment of (S3005 (S3006), and it returns to the judgment of whether there is any renewal child work of un-(S3005). When there is no child work of renewal of un-, the production-control program 8 updates resources information (S3007), and a series of work (S2216) of parent work move processing (S2210) and move processing (S2211) of related child work ends it (when a judgment is N in S3005).

[0128] The production control system concerning the gestalt of this operation described above is interlocking the work which has a parentage like. For this reason, a user can change automatically the child work or parent work related only by changing parent work or child work.

[0129] Moreover, the fixed lead time is established between parent work and child work as mentioned above, and a setup of a lead time is also possible beforehand. For this reason, the fault which forms production planning which cannot be carried out actually is also mitigable.

[0130] The above-mentioned operation gestalt described the polymerization process, the granulation process, and the powder shipment process for the example. However,

operation of this invention is not limited to such a process. For example, you may use as a production control system of the manufacturing process of an electric product. In the form of the <record-medium> above-mentioned implementation in which computer reading is possible, storage 5 was used as a record medium which records a program and in which computer reading is possible. Operation of this invention is not limited to the kind of this record medium.

[0131] Here, it accumulates by chemical work and the record medium in which computer reading is possible means electric, magnetic, optical, mechanical, or the record medium that can be read in a computer for information, such as data and a program. As what can be removed from a computer, there are a floppy disk, a magneto-optic disk, CD-ROM, CD-R / W, DVD and DAT, 8mm tape, memory card, etc. among such record media, for example.

[0132] Moreover, as a record medium fixed to the computer, there is a ROM (read only memory) besides a hard disk etc.

In the gestalt of the <other modification> above-mentioned implementation, the LISP language defines the data structure. However, operation of this invention is not limited to this language. For example, you may use C, a BASIC language, a FORTRAN language, etc.

[0133]

[Effect of the Invention] As explained above, according to this invention, a package dialog transfer method becomes possible and has the following effects.

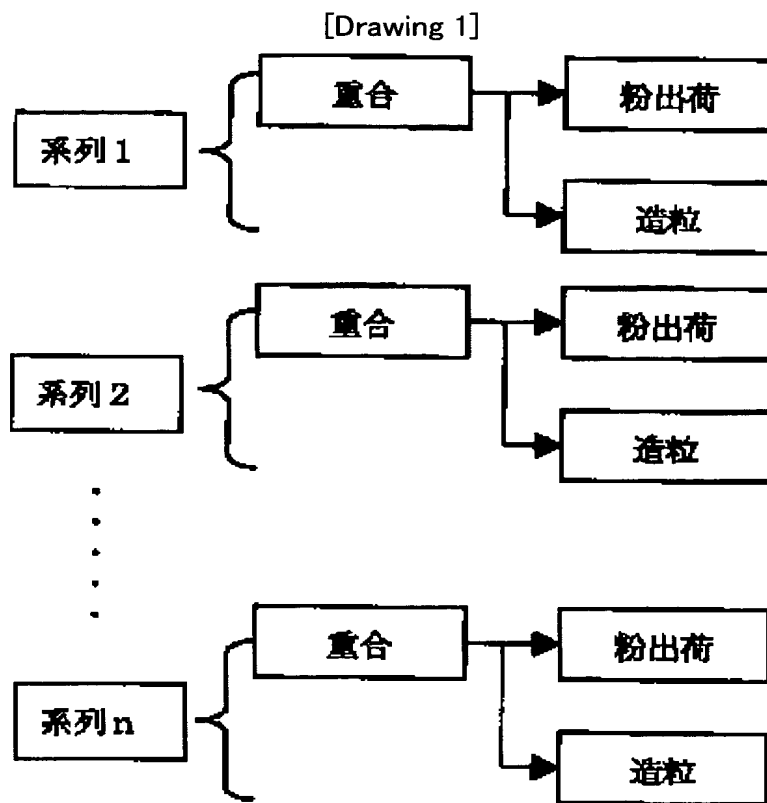
[0134] Parent work specification can realize without a production-planning person in charge being conscious of a parentage, and the verification time of planned correction and the time of a complicated transfer method can be saved. Moreover, it is good in the case of change of production planning that a production-planning person in charge makes a planned change how, or while becoming possible to become possible to repeat trial and error and a simulation beforehand, to release a production-planning person's in charge work content from simple work, and to apply time to intellectual work, it becomes possible to transmit the actual condition of a production site to a operating section or a customer at an early stage.

[0135] Furthermore, it becomes possible to judge the influence which production-planning change has in an instant, and even if it is not a skillful operator, it becomes possible to carry out planned change.

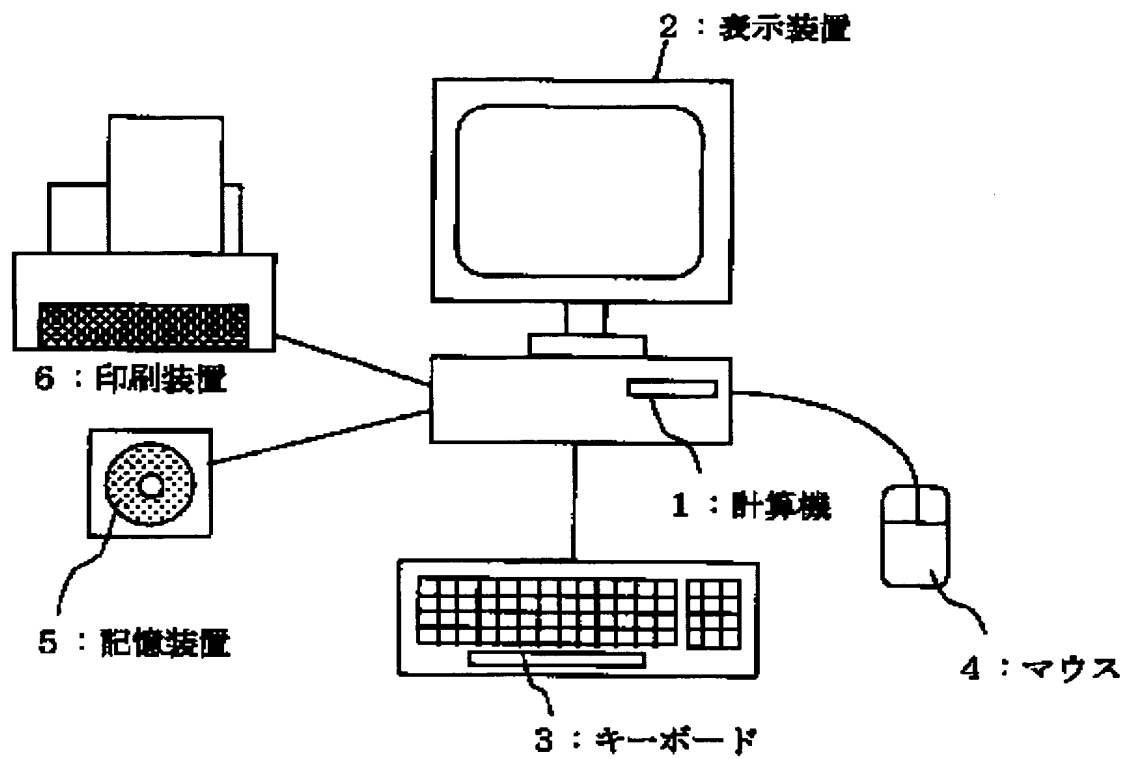
---

DRAWINGS

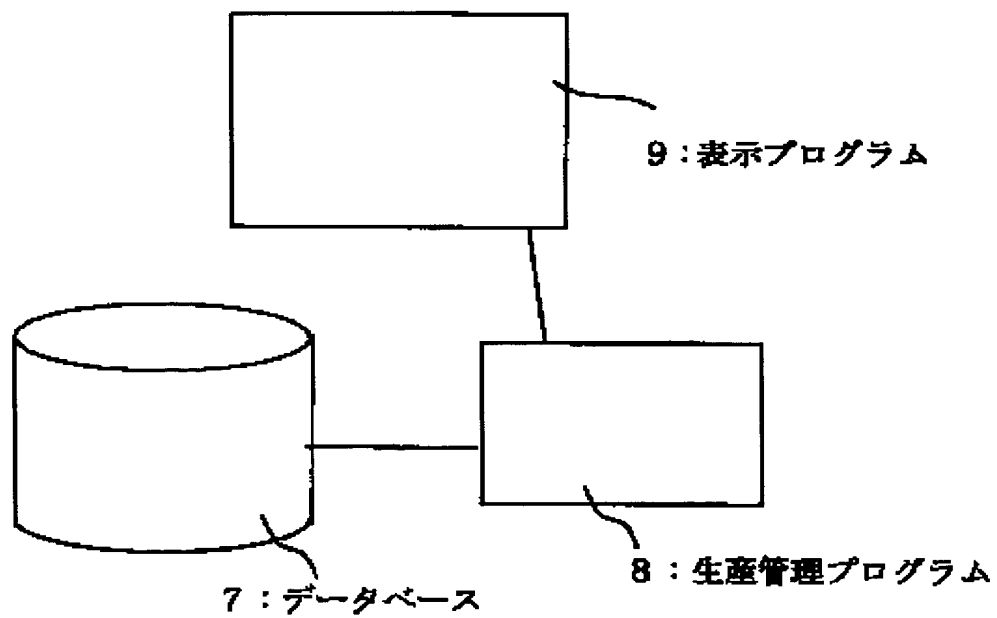
---



[Drawing 2]



[Drawing 3]





[Drawing 4]

10 : データ

<CARD名	CARD種類>
@属性名 1	属性値
@属性名 2	属性値
:	
:	
@属性名 n	属性値

[Drawing 5]

20 : 重合データ

製品情報のデータ構成

<重合名 1	重合>
@生産可能資源	(系列1 - 重合 系列2 - 重合)

21 : 銘柄データ

<銘柄名 1	銘柄>
@生産可能資源	(系列1 - 造粒 系列2 - 造粒)
@重合	重合名 1

[Drawing 6]

資源情報のデータ構成

25: 系列データ

<系列1	系列>
@重合	系列1-重合
@粉出荷	系列1-粉
@造粒	系列1-造粒

26: 資源データ

<系列1-A	資源>
@系列	系列1

[Drawing 7]

## 作業情報のデータ構成

30 : 親作業データ

<作業1	作業>
@資源	系列1-A
@製品	重合名1
@開始日時	1999年12月20日10時10分10秒
@終了日時	1999年12月30日10時10分10秒
@生産期間	10日間
@生産速度	1日/t
@生産量	10 t
@親作業	
@子作業	(作業2 作業3 作業4)

31 : 子作業データ

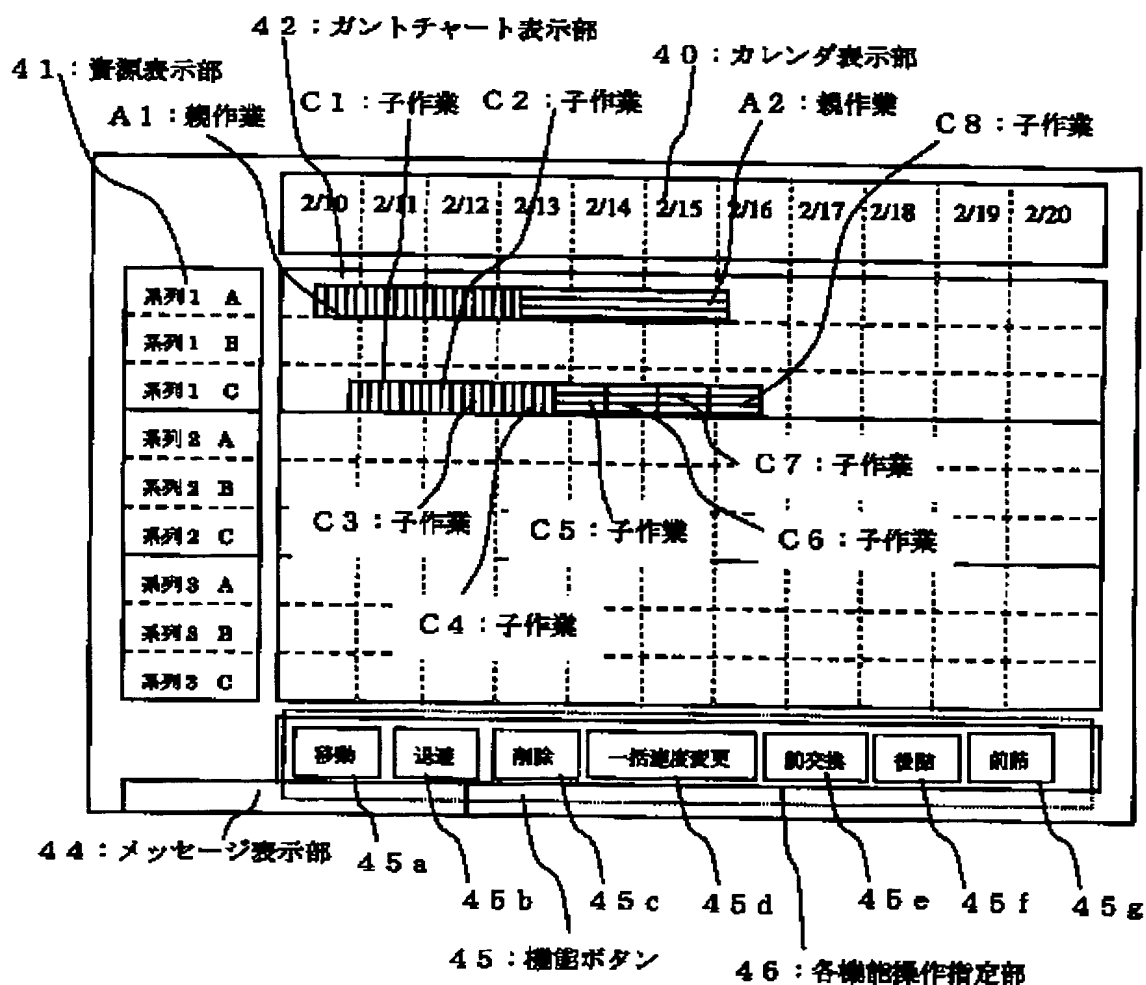
<作業2	作業>
@資源	系列1-造粒
@製品	銘柄名1
@開始日時	1999年12月20日12時10分10秒
@終了日時	1999年12月24日12時10分10秒
@生産期間	4日間
@生産速度	1日/t
@生産量	4 t
@親作業	作業1
@子作業	

[Drawing 8]

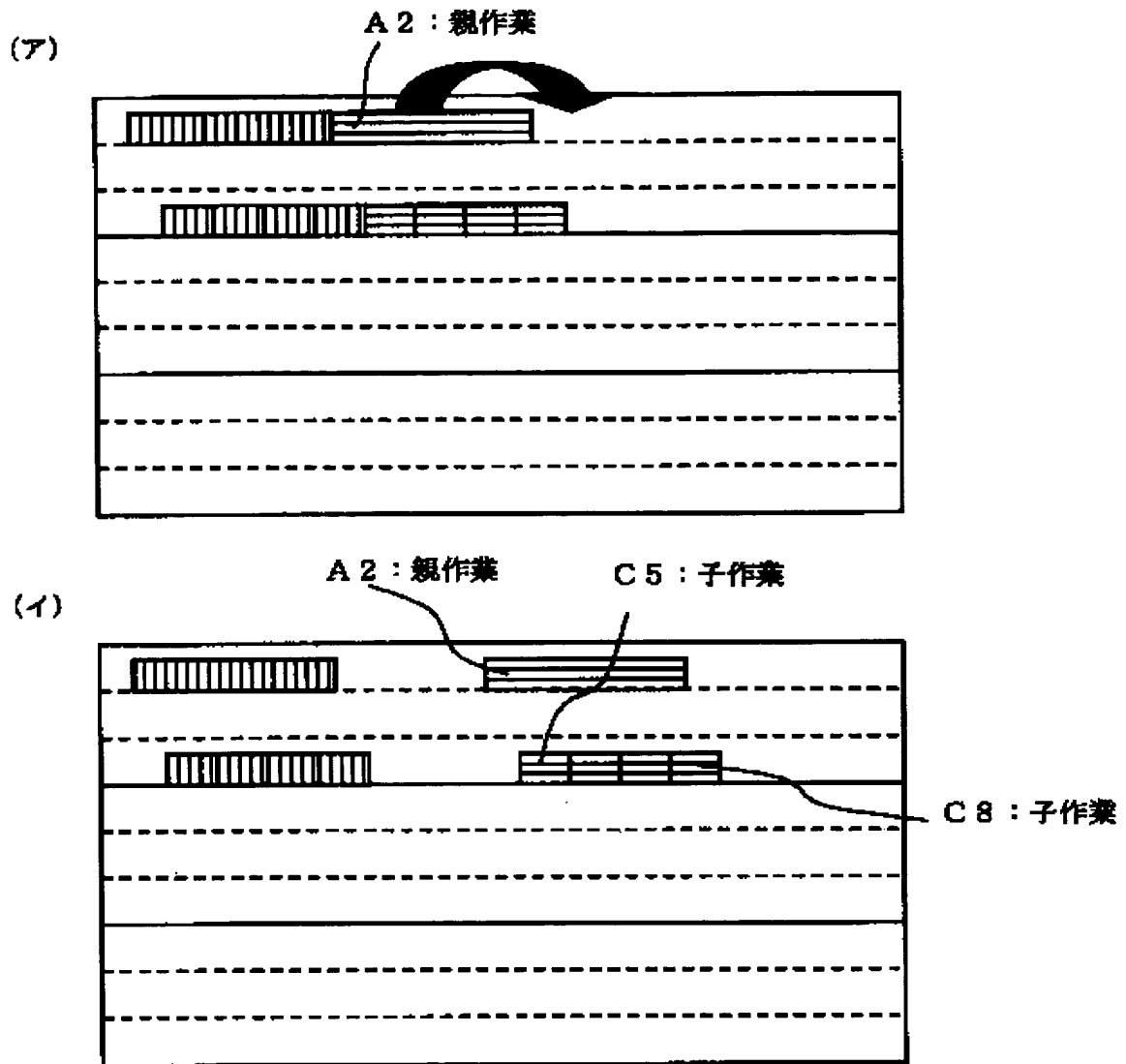
資源が保持する作業情報

<系列1-造粒	資源>
◎系列	系列1
◎作業	(作業2 作業3 作業4)

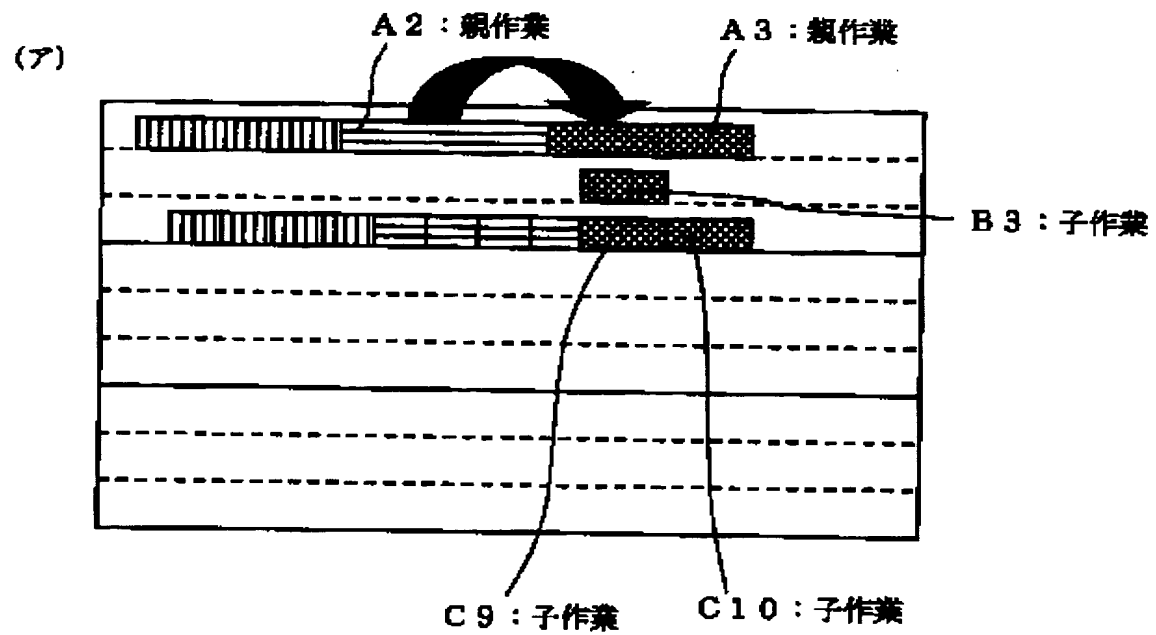
[Drawing 9]



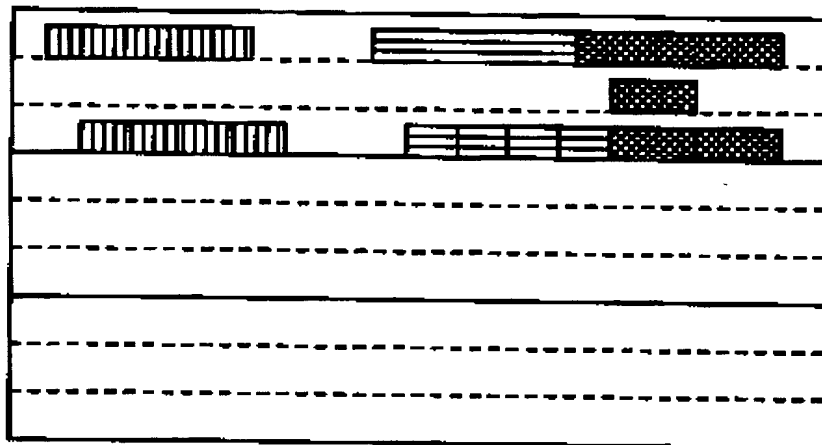
[Drawing 10]



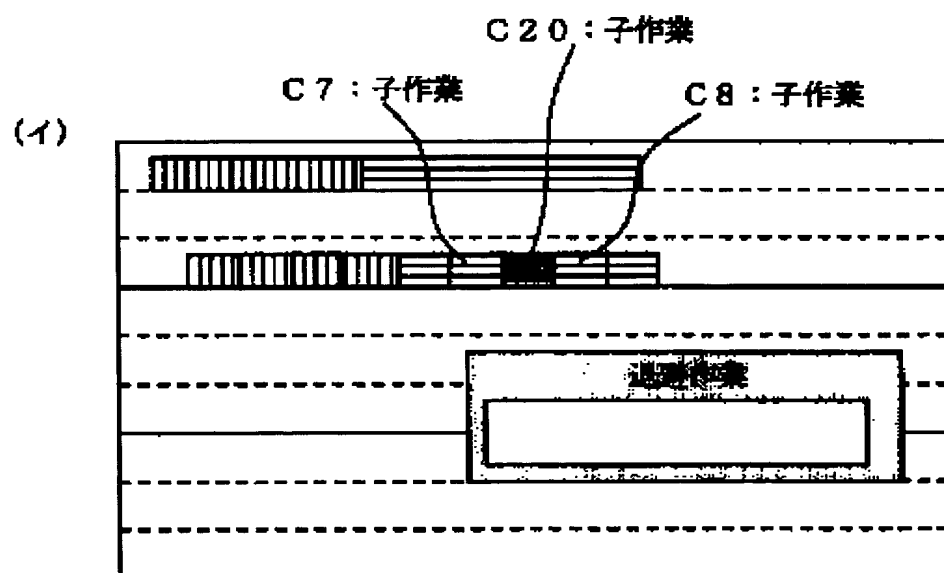
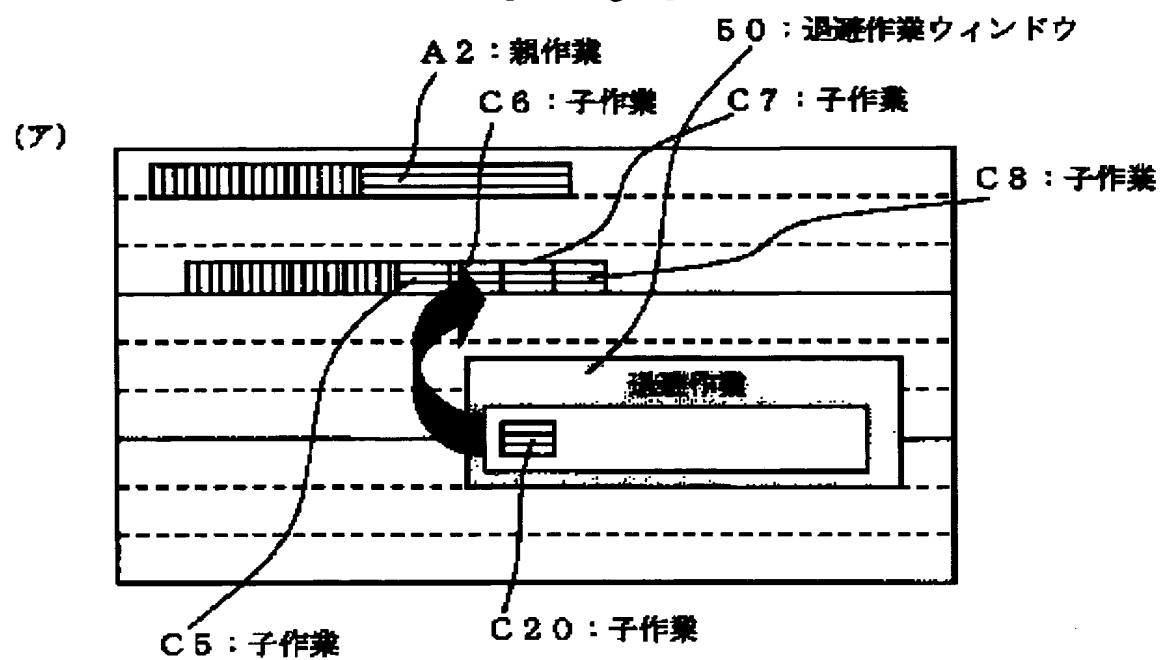
[Drawing 11]



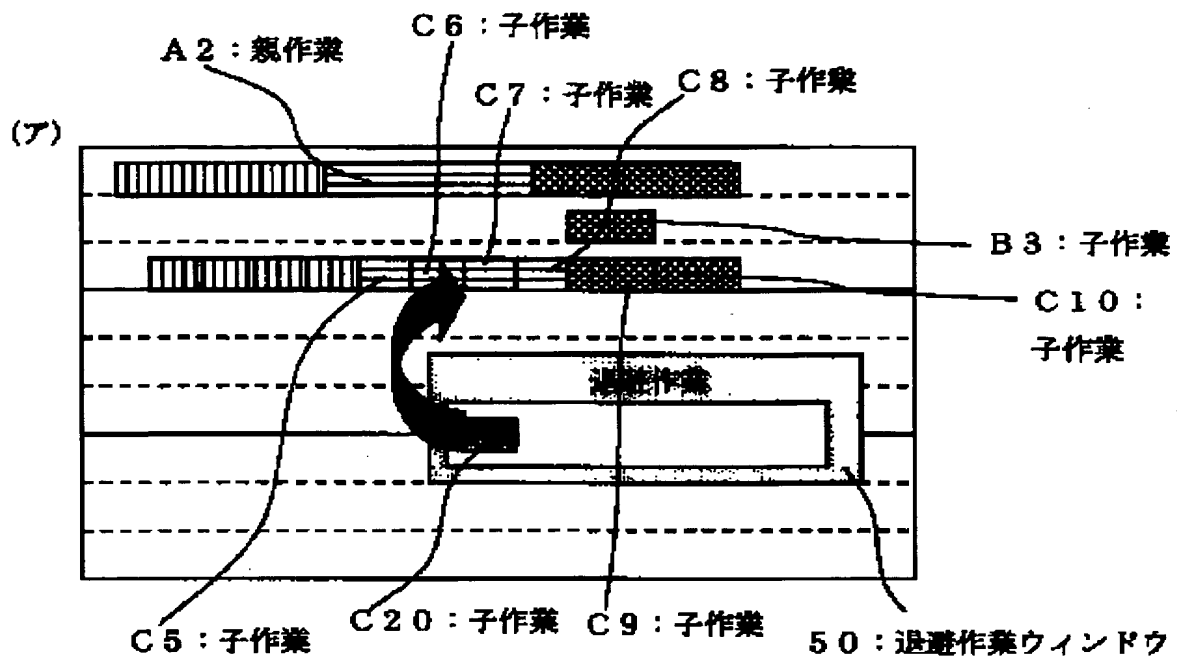
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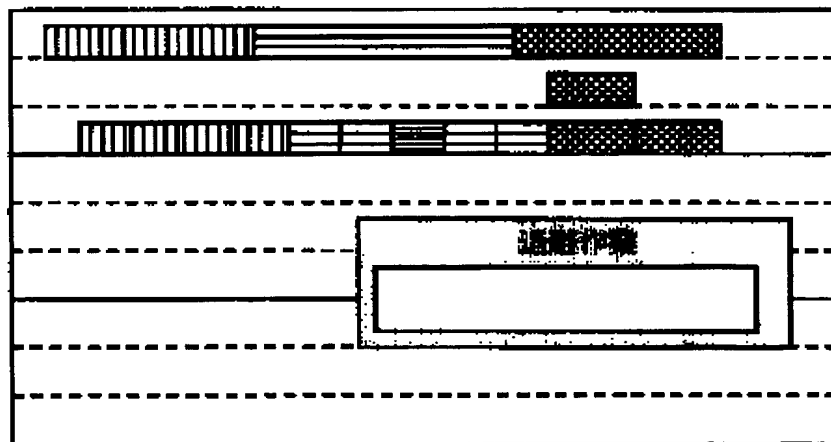
[Drawing 12]



[Drawing 13]

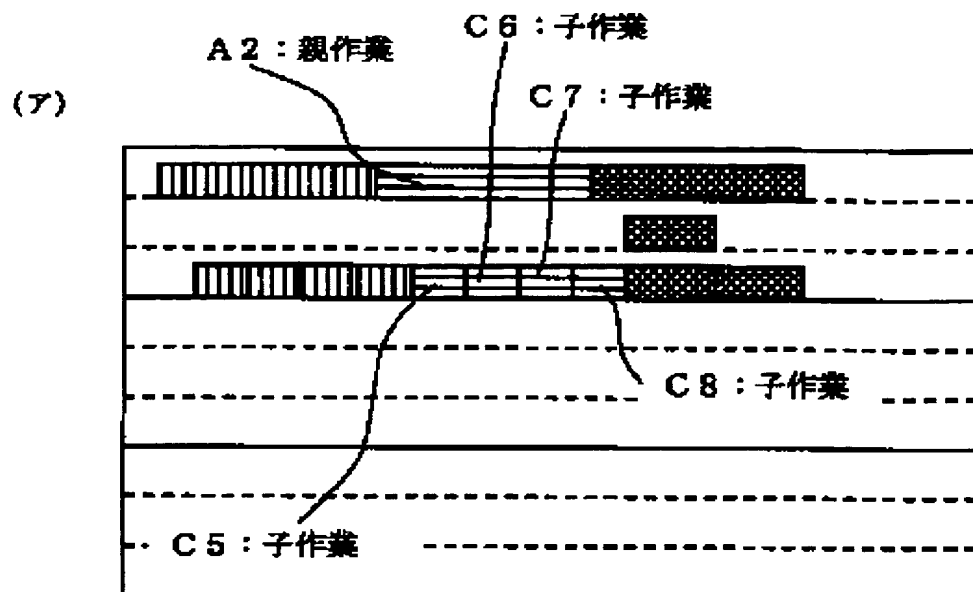


(イ)

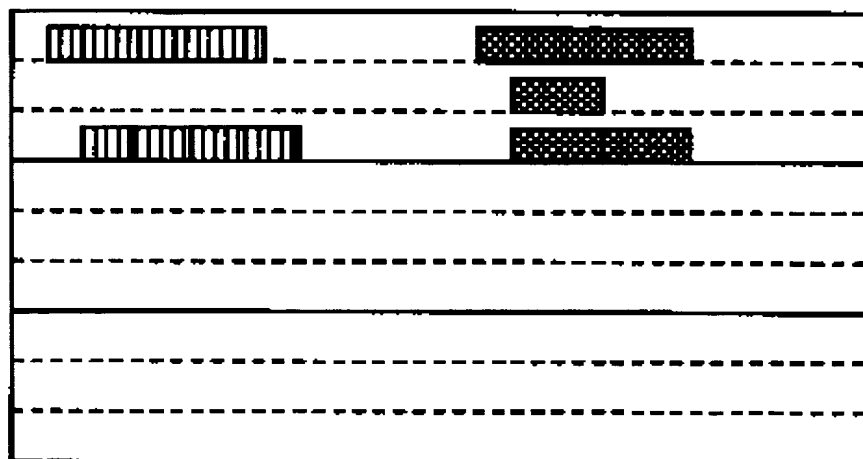




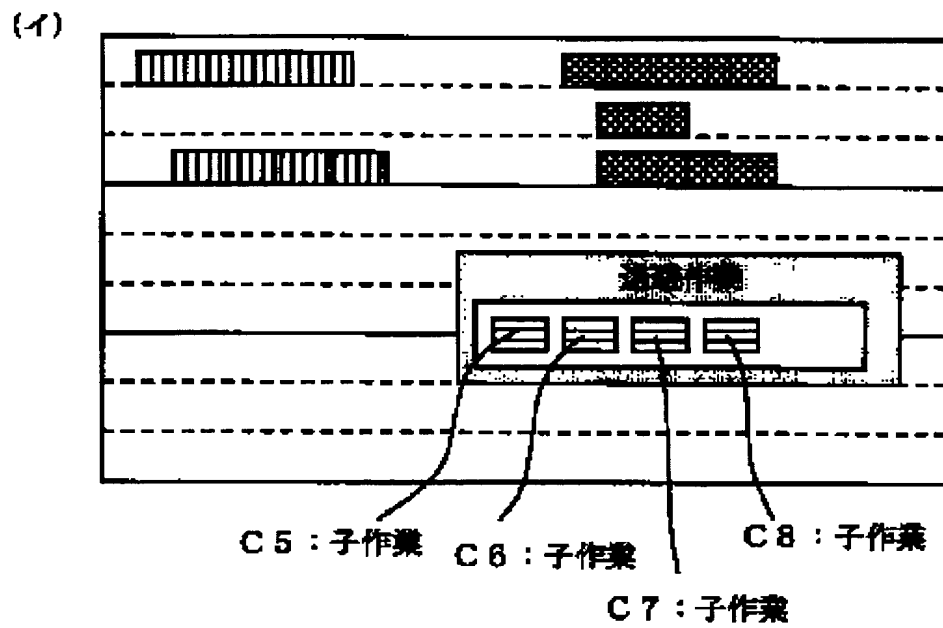
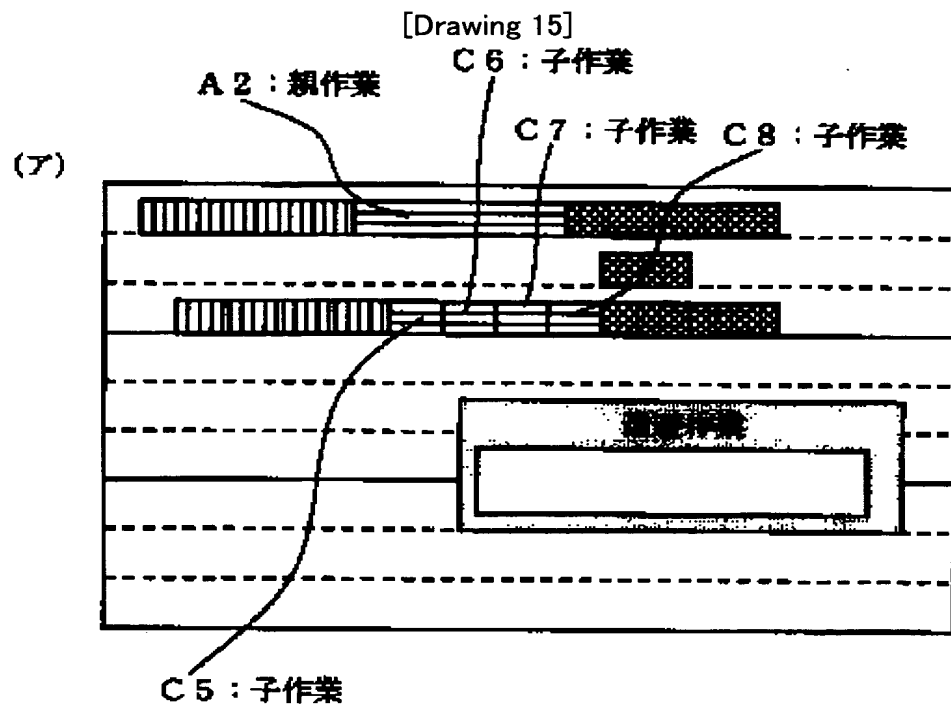
[Drawing 14]



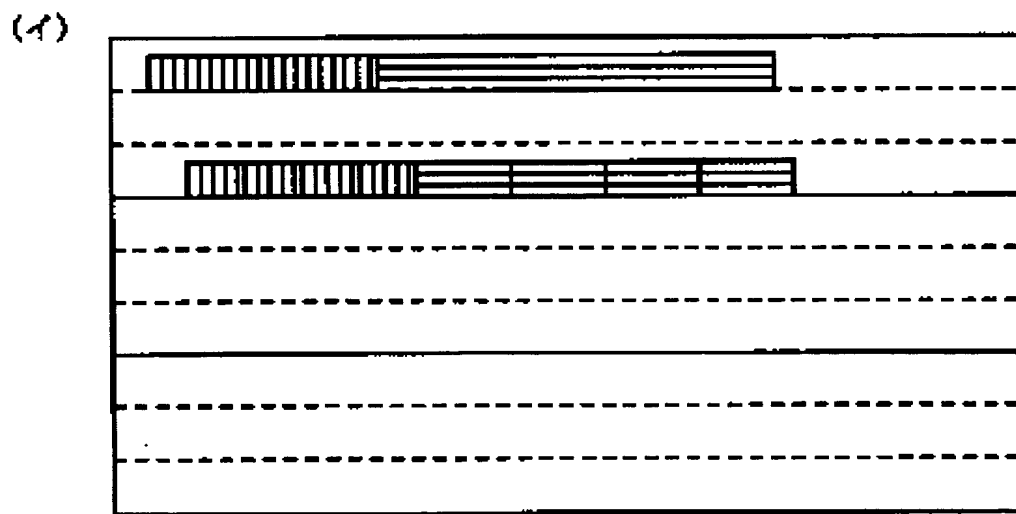
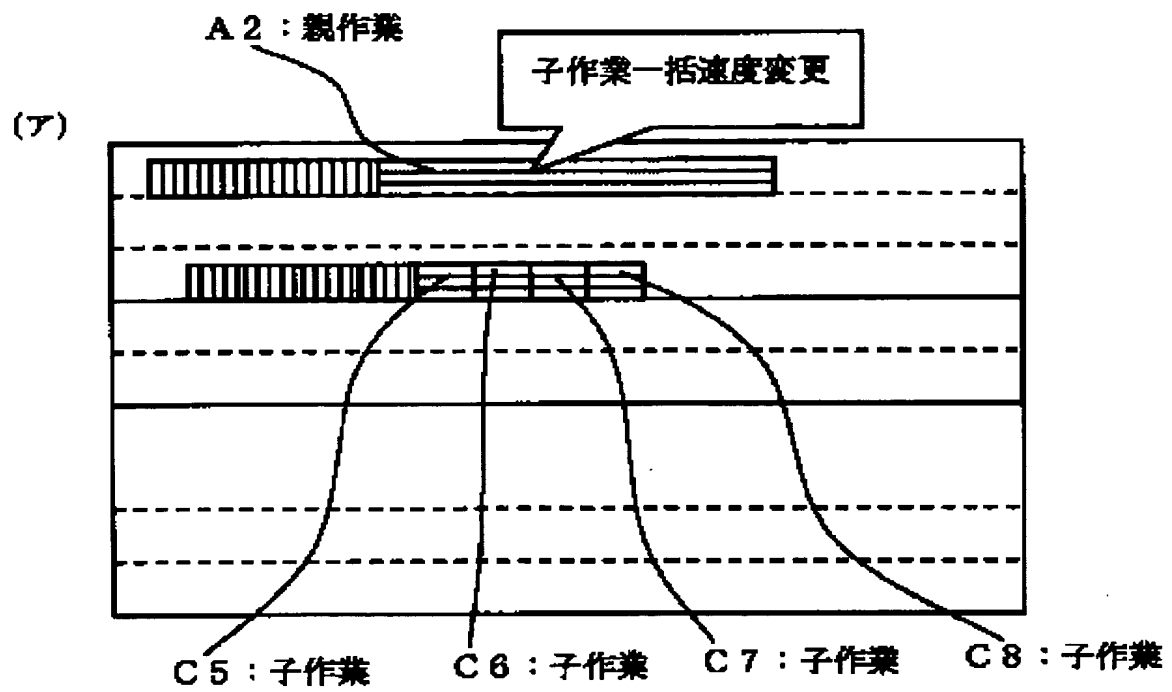
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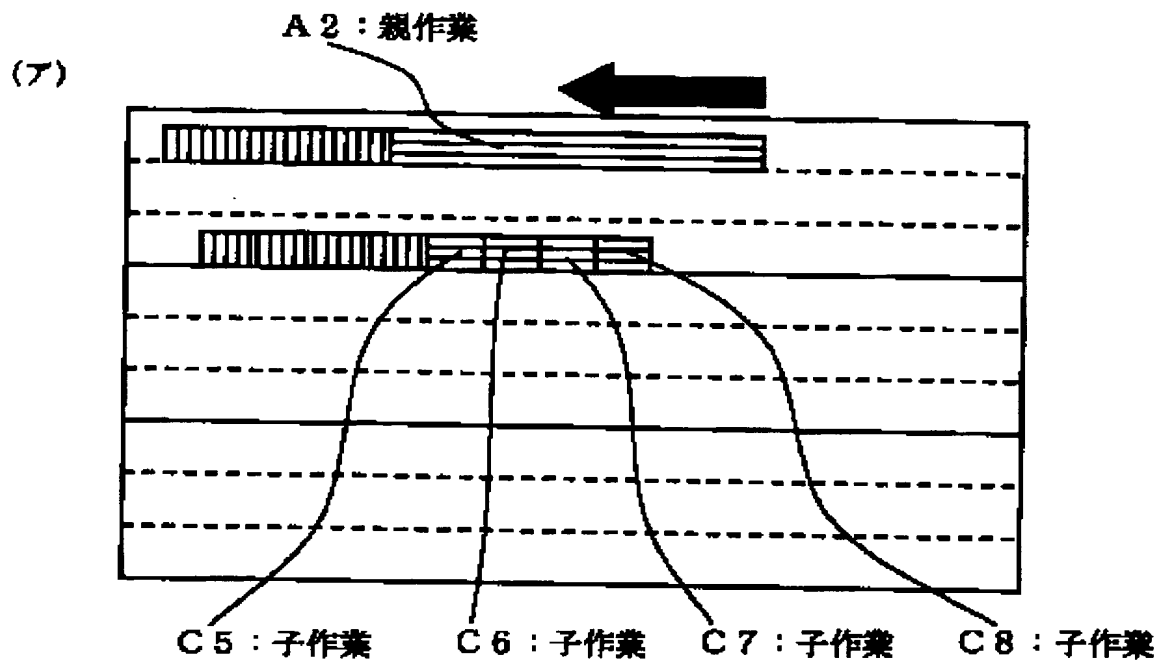
[Drawing 15]



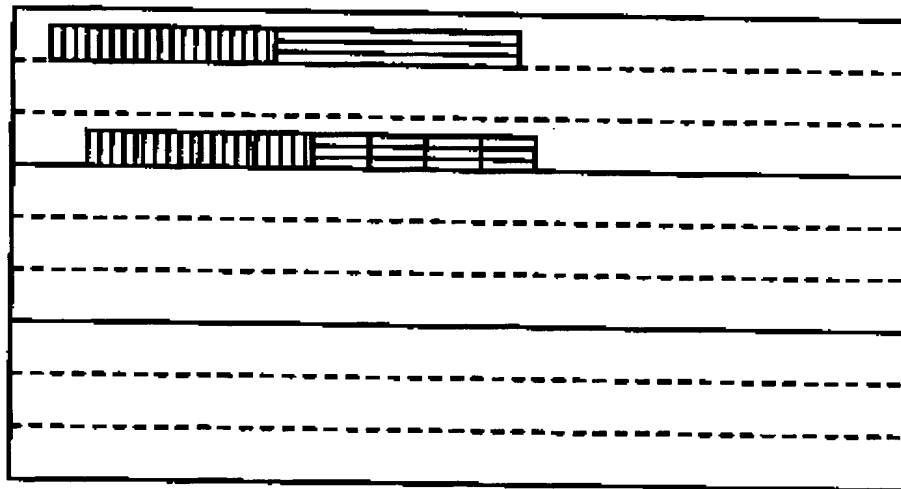
[Drawing 16]



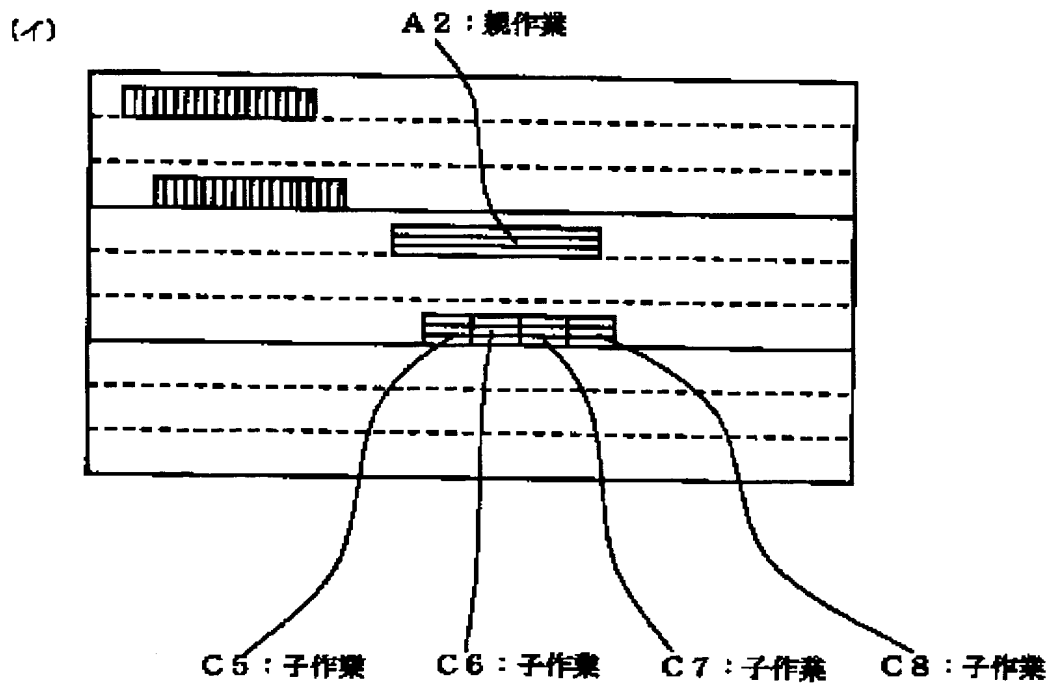
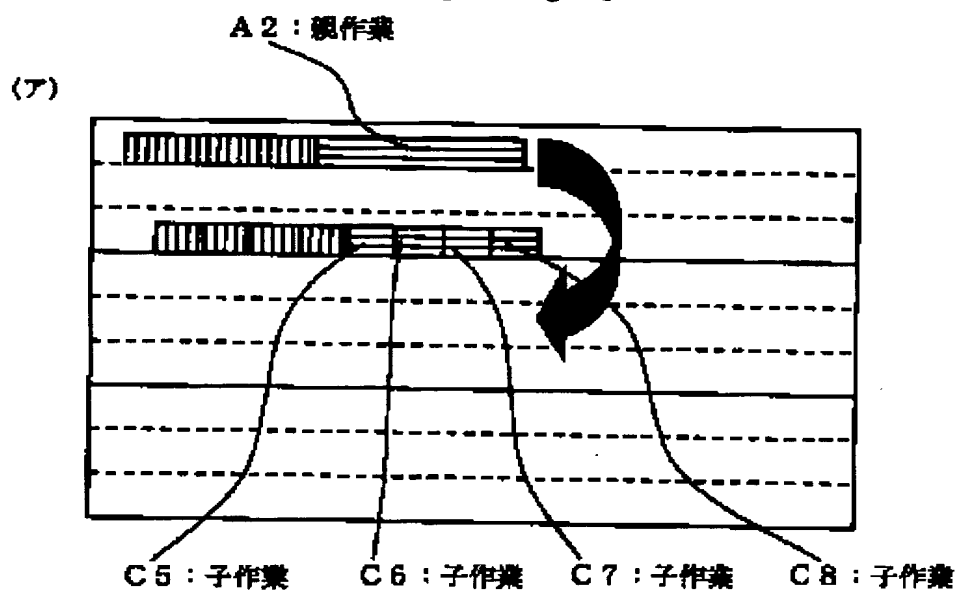
[Drawing 17]



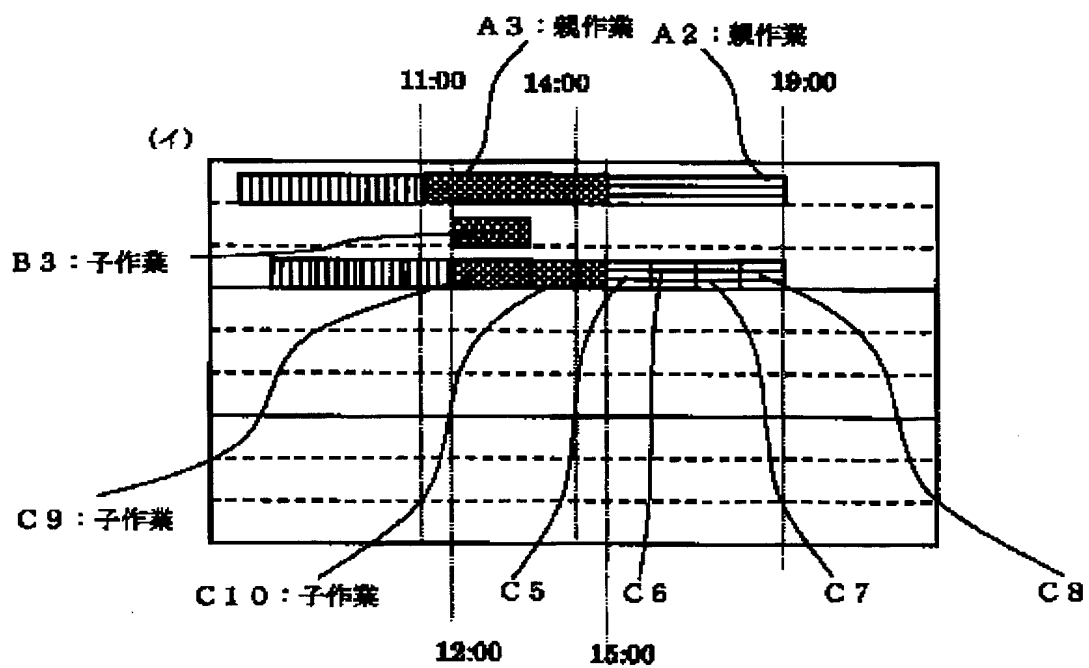
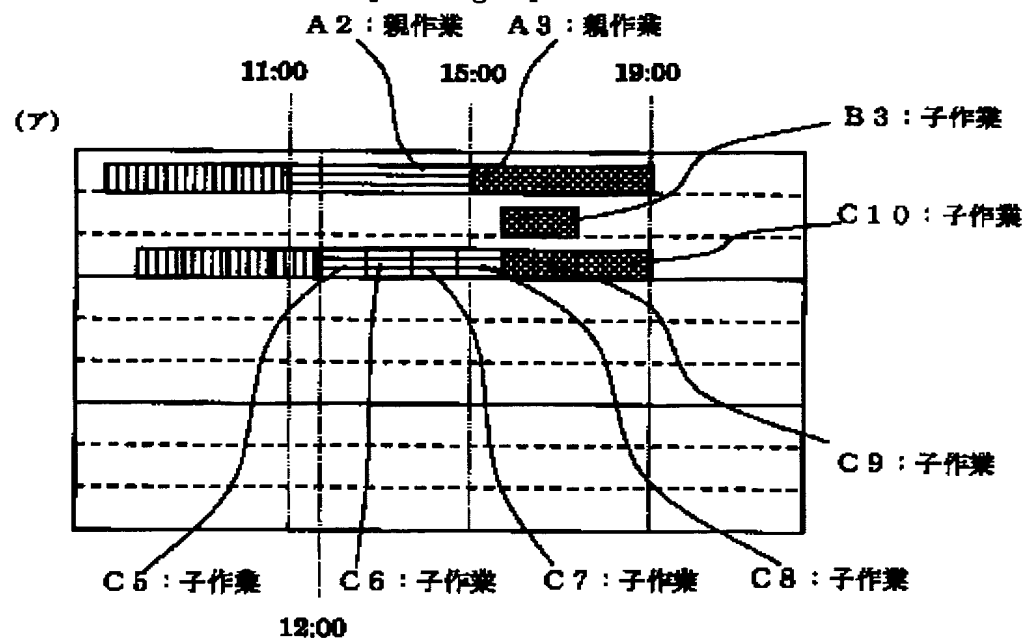
(イ)



[Drawing 18]



[Drawing 19]



[Drawing 20]

(ア)

30a: 親作業データ

<作業A2 作業>	
④資源	系列1-A
④製品	重合名1
④開始日時	1999年12月20日11時0分
④終了日時	1999年12月20日15時0分
④生産期間	4時間
④生産速度	1時間/50kg
④生産量	200kg
④親作業	
④子作業	(作業C5 作業C6 作業C7 作業C8)

(イ)

31a: 子作業データ

<作業C5 作業>	
④資源	系列1-造粒
④製品	銘柄名1
④開始日時	1999年12月20日12時0分
④終了日時	1999年12月20日13時0分
④生産期間	1時間
④生産速度	1時間/50kg
④生産量	50kg
④親作業	作業A2
④子作業	

[Drawing 21]

(ア)

30b: 親作業データ

<作業A2 作業>	
④資源	系列1-A
④製品	重合名1
④開始日時	1999年12月20日15時0分
④終了日時	1999年12月20日19時0分
④生産期間	4時間
④生産速度	1時間/50kg
④生産量	200kg
④親作業	
④子作業	(作業C5 作業C6 作業C7 作業C8)

(イ)

31b: 子作業データ

<作業C5 作業>	
④資源	系列1-造粒
④製品	銘柄名1
④開始日時	1999年12月20日15時0分
④終了日時	1999年12月24日16時0分
④生産期間	1時間
④生産速度	1時間/50kg
④生産量	50kg
④親作業	作業A2
④子作業	

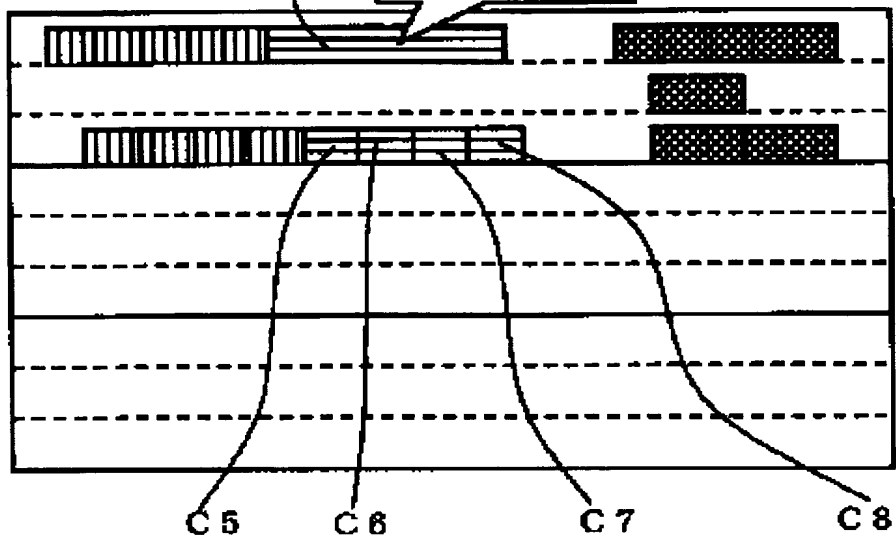


[Drawing 22]

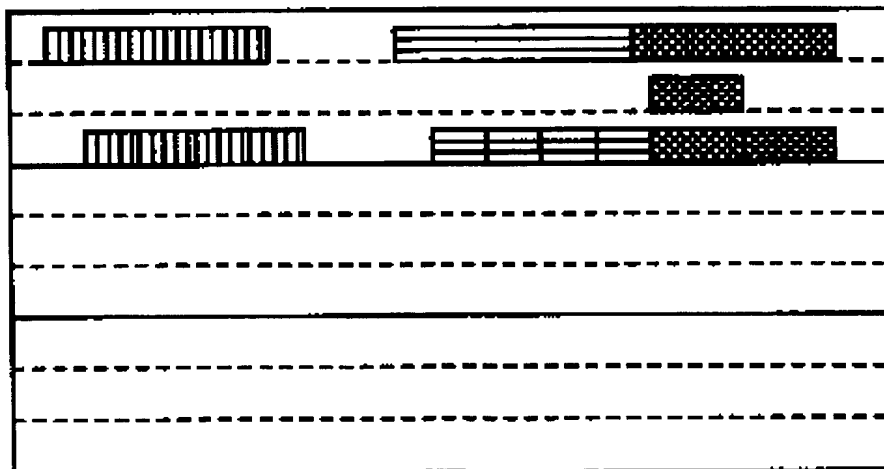
A 2 : 親作業

後詰め指示

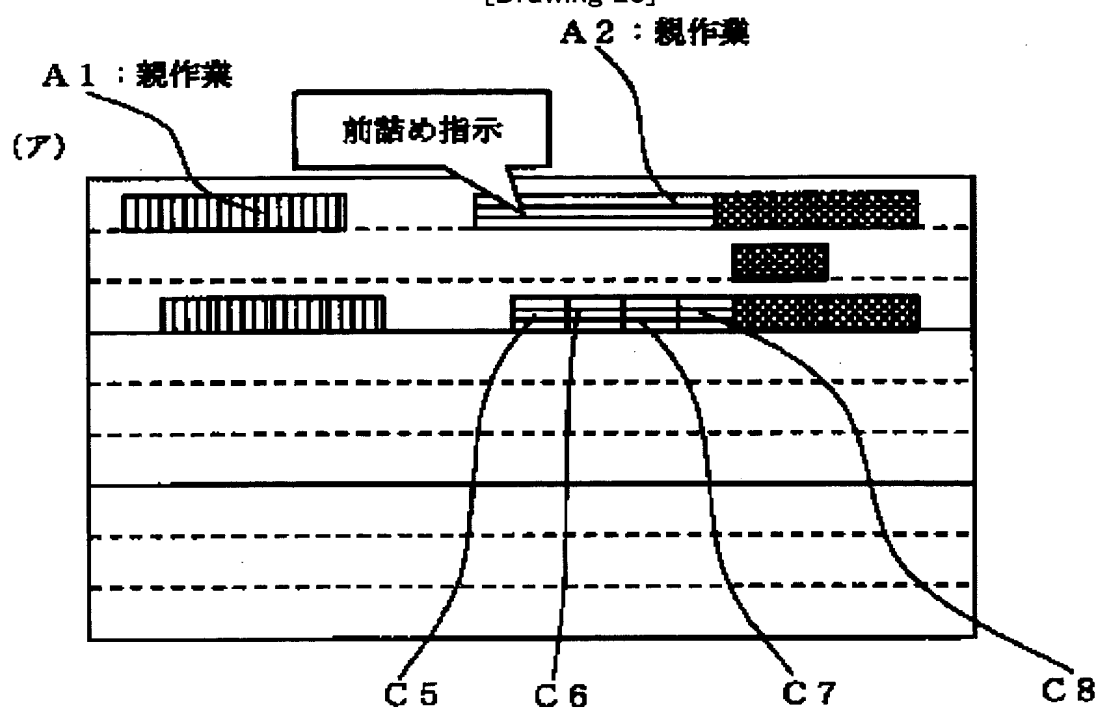
(ア)



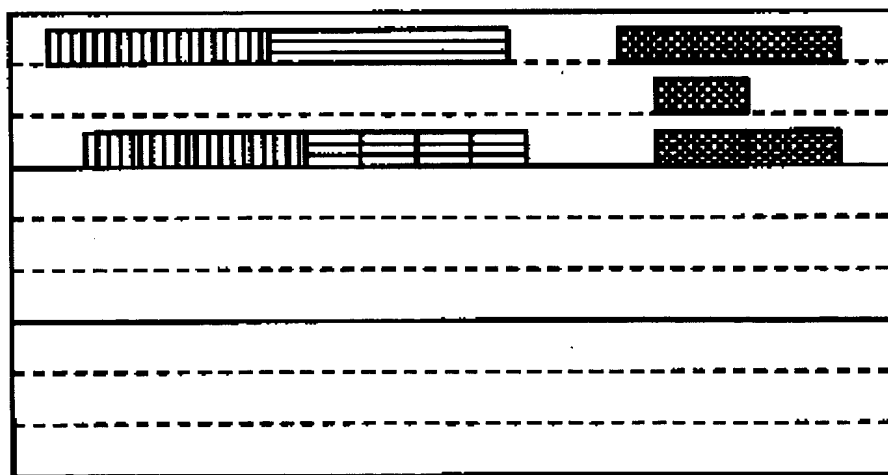
(イ)



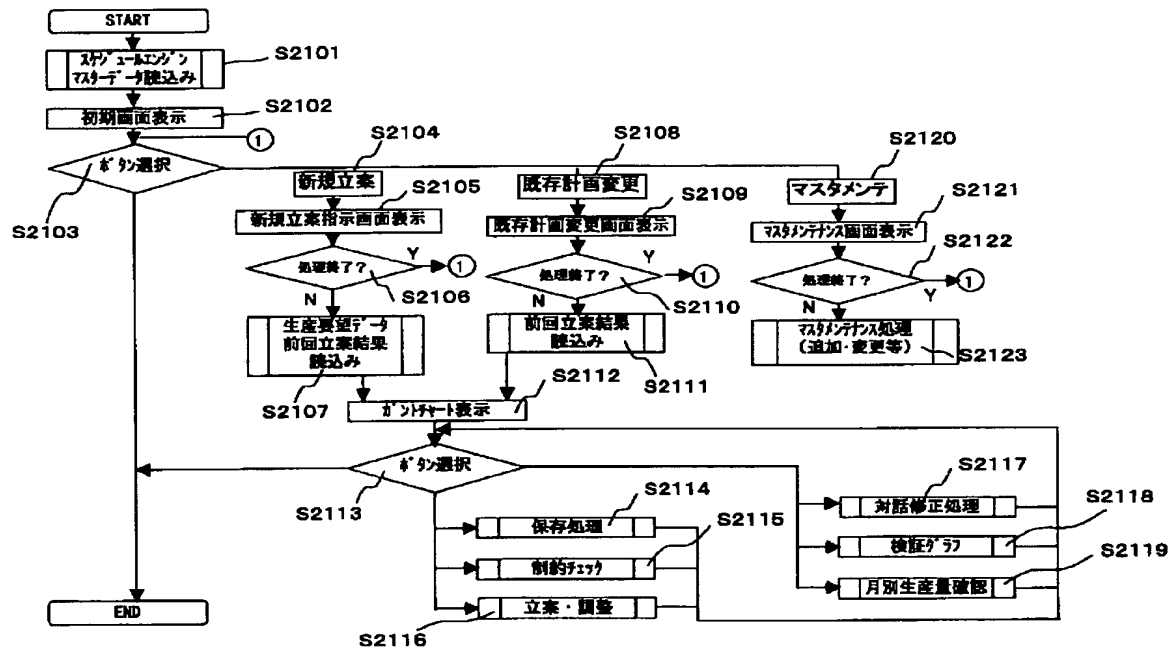
[Drawing 23]



(イ)

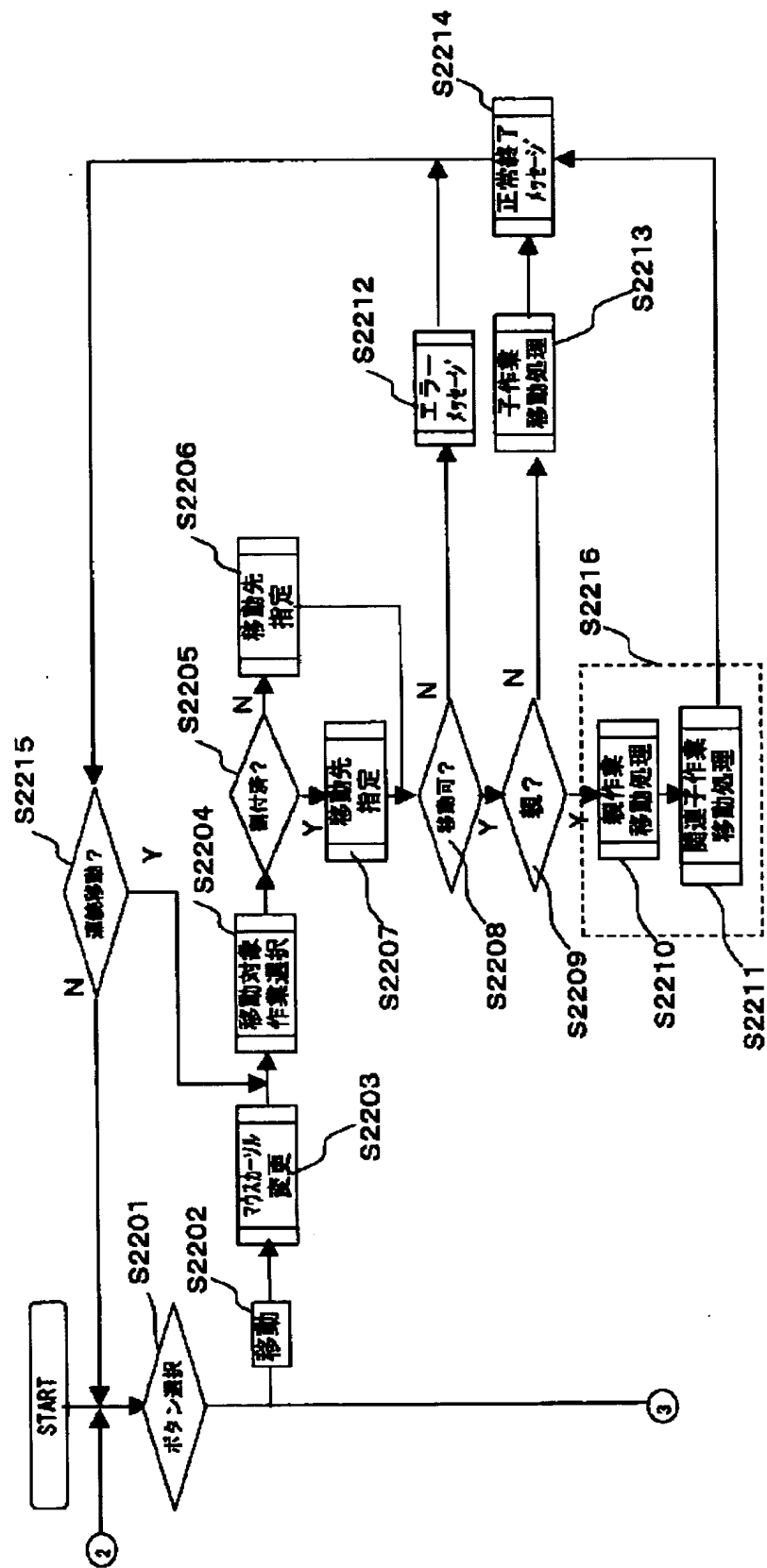


[Drawing 24]

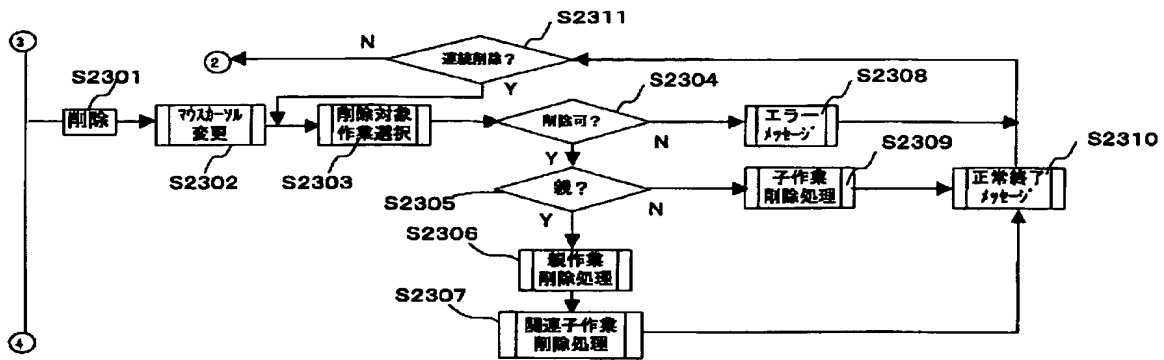




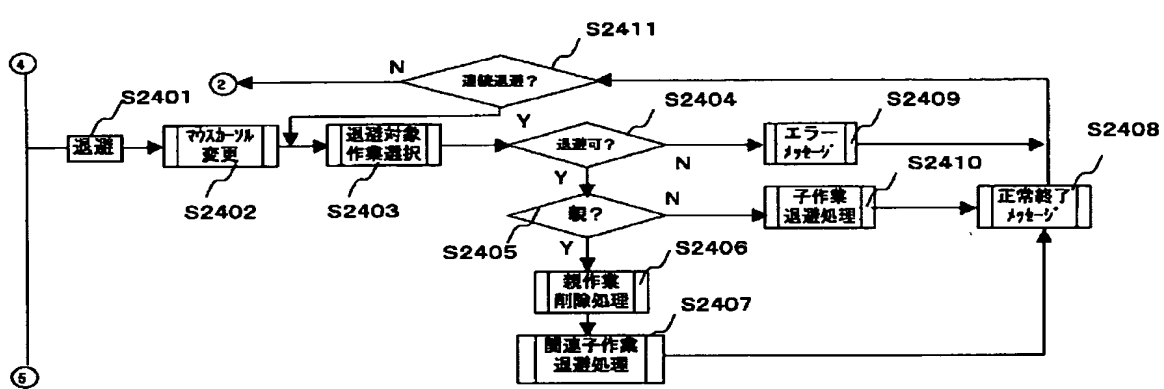
[Drawing 25]



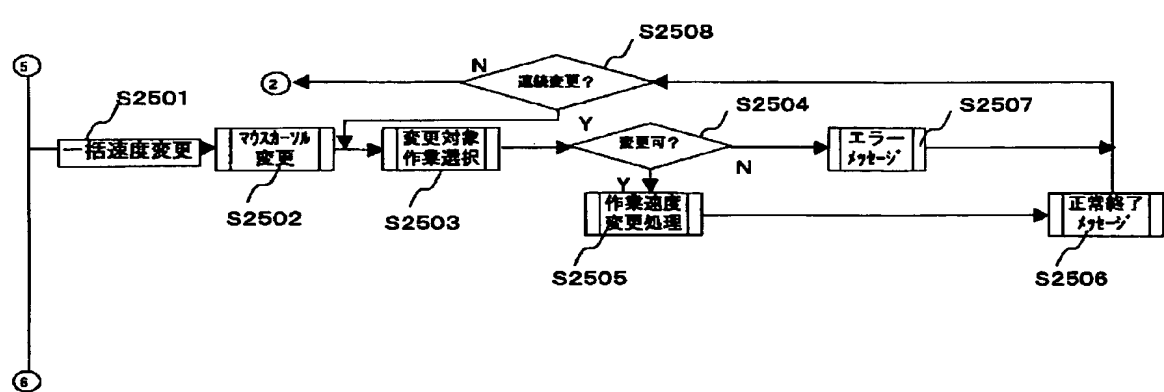
[Drawing 26]



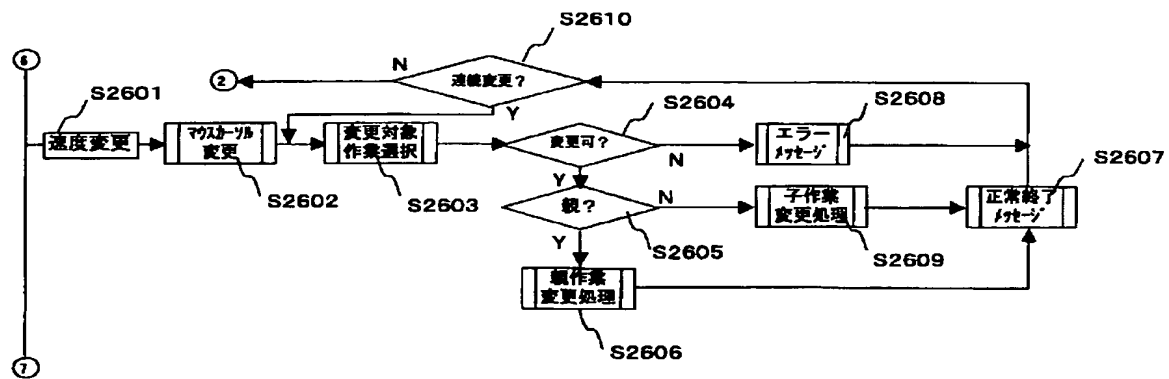
[Drawing 27]



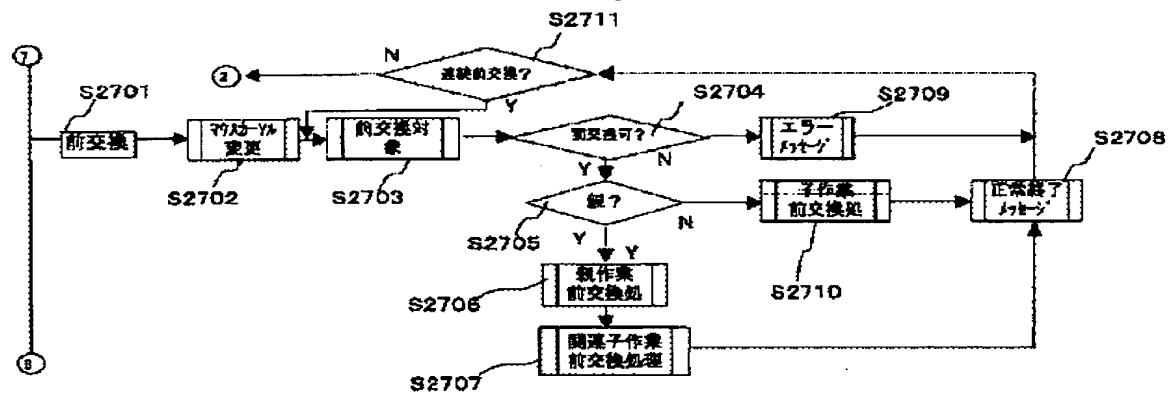
[Drawing 28]



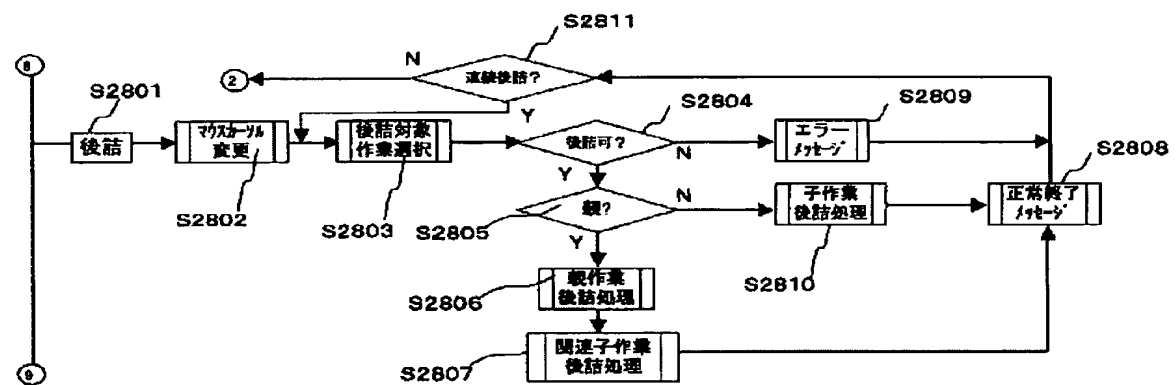
[Drawing 29]



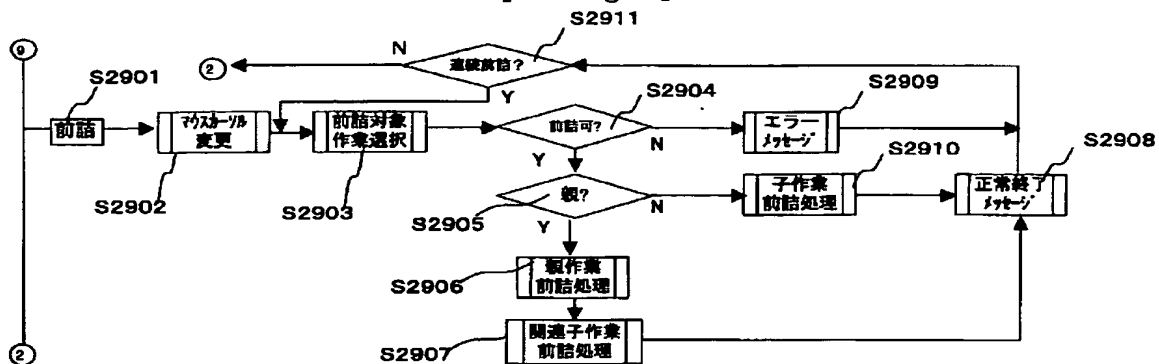
[Drawing 30]



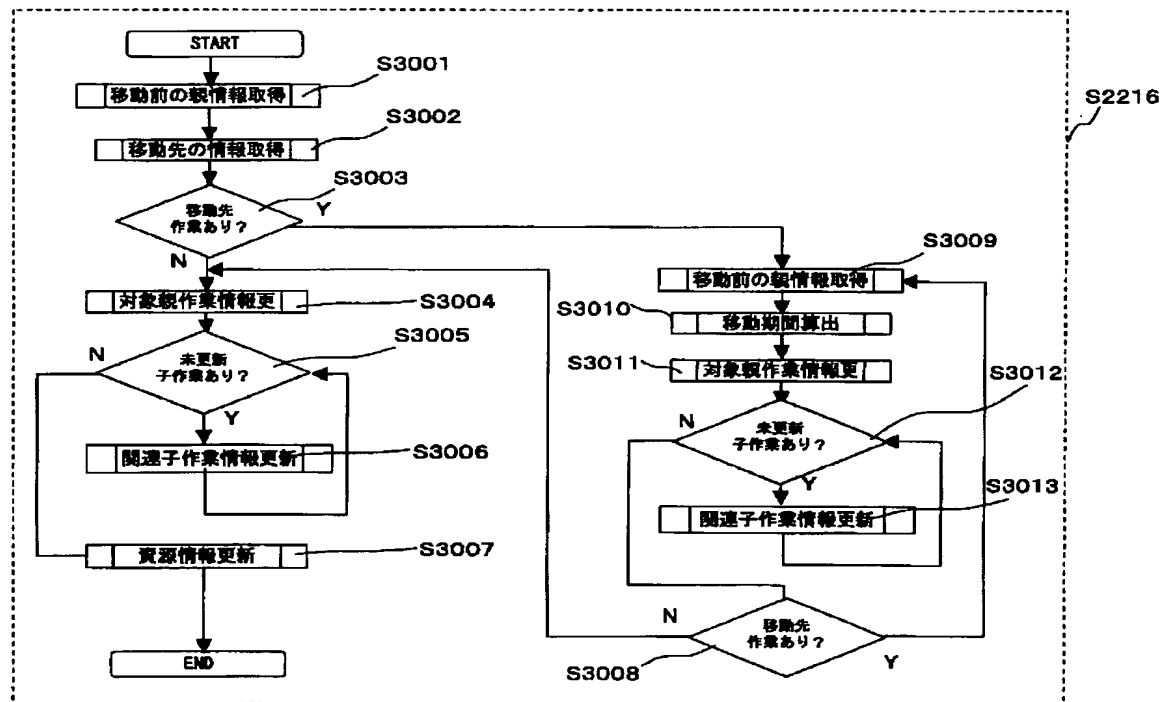
[Drawing 31]



[Drawing 32]



[Drawing 33]



## DESCRIPTION OF DRAWINGS

## [Brief Description of the Drawings]

[Drawing 1] It is drawing showing the production process of the synthetic resin set as the object of management of the production planning system in the gestalt of operation of this invention.



[Drawing 2] It is drawing showing the hardware composition of the production planning system concerning the gestalt of this invention.

[Drawing 3] It is drawing showing the program composition of the production planning system concerning the gestalt of this invention.

[Drawing 4] It is drawing showing the data structure of the production planning system concerning the gestalt of this invention.

[Drawing 5] It is the example of composition of the data concerning the gestalt of this invention.

[Drawing 6] It is the example of composition of the data concerning the gestalt of this invention.

[Drawing 7] It is the example of composition of the data concerning the gestalt of this invention.

[Drawing 8] It is the example of composition of the data concerning the gestalt of this invention.

[Drawing 9] It is drawing showing the operation screen of a production-control program.

[Drawing 10] It is drawing showing move operation of the work to an empty period.

[Drawing 11] It is drawing showing move operation of the work to a non-opening period.

[Drawing 12] It is drawing showing move operation of evacuation work in case there is no next schedule in the influenced parent work.

[Drawing 13] It is drawing showing move operation of evacuation work in case the influenced parent work has a next schedule.

[Drawing 14] It is drawing showing deletion operation of work.

[Drawing 15] It is drawing showing operation of primary evacuation of work.

[Drawing 16] It is drawing showing operation of package speed change of work.

[Drawing 17] It is drawing showing operation of package speed change of work.

[Drawing 18] It is drawing showing operation of other resources movement of work.

[Drawing 19] It is drawing showing operation of pre-exchange of work.

[Drawing 20] It is drawing showing parent work data and child work data just before pre-exchange of work is performed.

[Drawing 21] It is drawing showing the parent work data and child work data immediately after performing pre-exchange of work.

[Drawing 22] It is drawing showing operation of the final stage after work.

[Drawing 23] It is drawing showing operation of front stuffing of work.

[Drawing 24] It is drawing showing the whole processing of a production-control

program and a display program.

[Drawing 25] It is drawing showing the flow of processing at the time of choosing a move button.

[Drawing 26] It is drawing showing the flow of processing at the time of choosing a deletion button.

[Drawing 27] It is drawing showing the flow of processing at the time of choosing an evacuation button.

[Drawing 28] It is drawing showing the flow of processing at the time of choosing a package speed change button.

[Drawing 29] It is drawing showing the flow of processing at the time of choosing a speed change button.

[Drawing 30] It is drawing showing the flow of processing at the time of choosing a pre-exchange button.

[Drawing 31] It is drawing showing the flow of processing at the time of choosing a back \*\* button.

[Drawing 32] It is drawing showing the flow of processing at the time of choosing a front \*\* button.

[Drawing 33] It is drawing showing a series of work of the parent work move processing in drawing 25 , and move processing of related child work.

[Description of Notations]

1 Computer

2 Display

3 Keyboard

4 Mouse

5 Storage

6 Printer

7 Database

8 Production-Control Program

9 Display Program

10 Data

20 Polymerization Data

21 Brand Data

25 Sequence Data

26 Resources Data

30 Parent Work Data

31 Child Work Data

40 Calender Display  
41 Resources Display  
42 Gantt Chart Display  
44 Message Indicator Section  
45 Feature Button  
45a Move button  
45b Evacuation button  
45c Deletion button  
45d Package speed change button  
45e Pre-exchange button  
45f Back \*\* button  
45g Front \*\* button  
46 Each Functional Operation Specification Part  
50 Evacuation Work Window  
A1-A3 Parent work  
B1-B3 Child work  
C1-C10 Child work  
C20 Child work